FARM CHEMICALS

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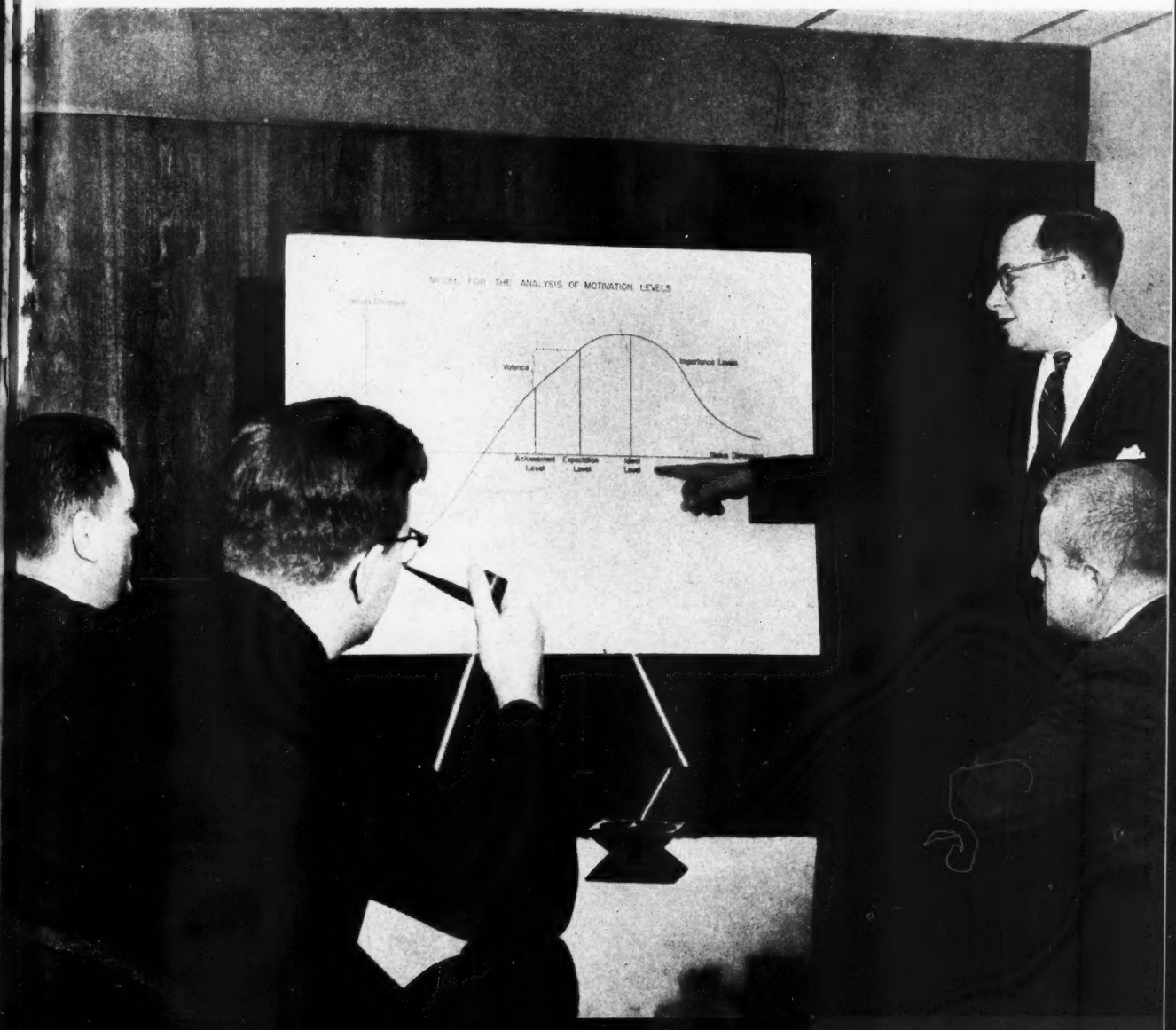
Pioneer Journal of the Industry

UNIVERSITY OF MINNESOTA
AGRICULTURE
FEB 4 1959



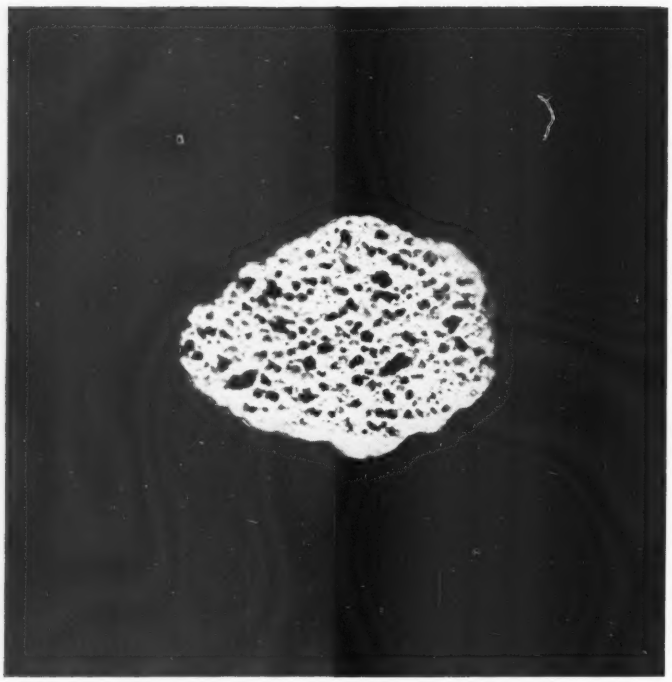
ntroducing our new
editorial program
emphasizing marketing

How to upgrade your merchandising practices

Service — key to more sales in 1959

Better pricing policies

Swift's PC-47



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P-2

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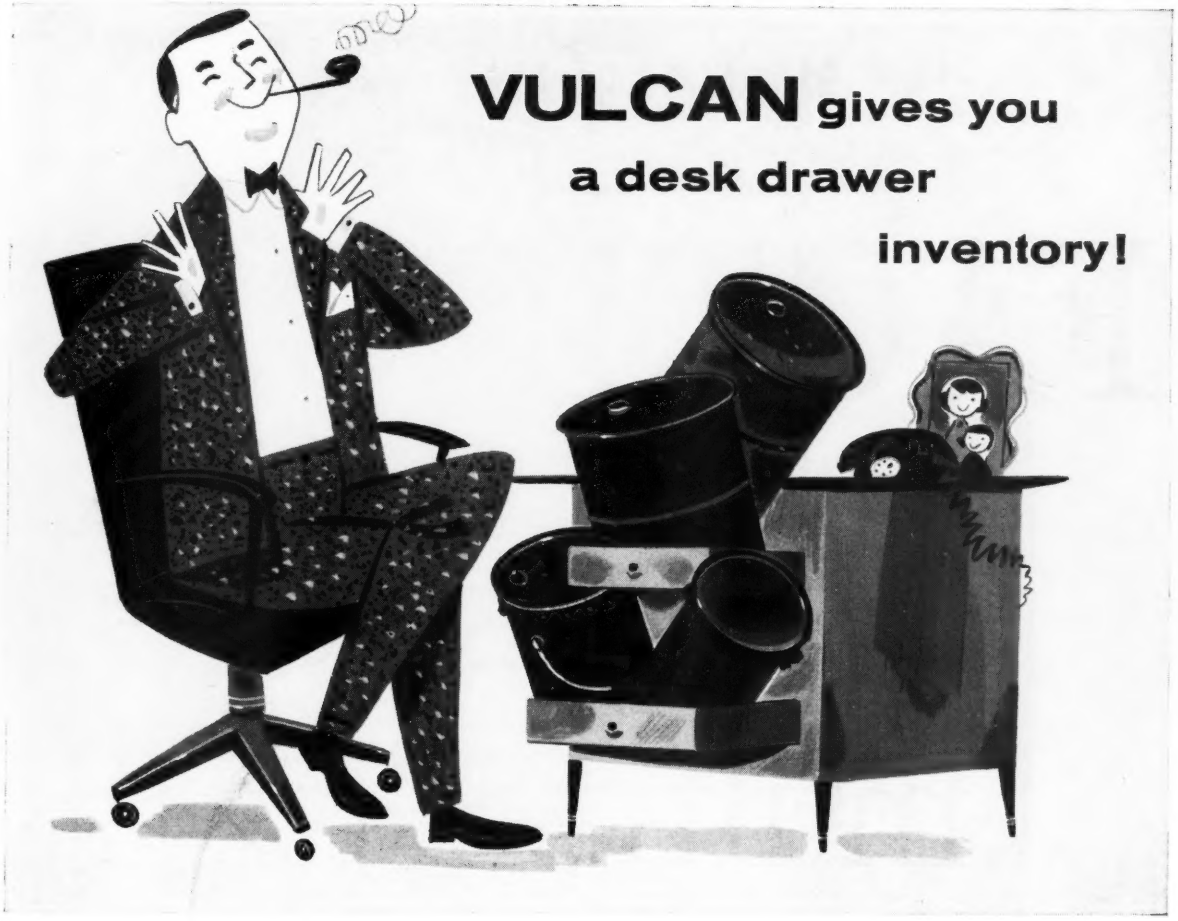

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There is no multiwall like
WONDERWALL™
(the Toughness Champ... made from CLUPAK* paper)
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WONDERWALL™ WINS!

PROOF!

WONDERWALL is the great new development in multiwall bags that makes all ordinary bags old-fashioned. Proof? Here it is! And it's from the field itself—from the roughest, toughest "testing ground" of all! Read what manufacturers of fertilizers are saying about WONDERWALLS.

"WONDERWALLS ***are the best we have ever used for fertilizer. No breakage in trucks shipped to date.***"

"*So far losses due to breakage with the new* WONDERWALL *bags have been remarkably low. We estimate our breakage rate will be reduced by 60% or more in both storage and shipping.*"

"***We tested the breakage of 80# three-ply*** WONDERWALLS ***(1/100 AL, 1/40, 1/50, total basis paper weight 160#) against 80# three-ply regular bags (1/90 AL, 2/60, total basis paper weight 180#).*** WONDERWALLS ***proved 400% better in this test.***"

"WONDERWALL *bag performance was excellent. Bags were filled with valve packers at a speed of 500 bags per hour. Breakage was only one third of one per cent.*"

"***In drop tests, we found that*** WONDERWALLS ***outlasted ordinary bags by three times.***"

The proof keeps piling up—WONDERWALLS outperform ordinary multiwall bags. Reason: they're made of remarkably tougher Clupak paper—the paper that stretches . . . the paper that "soaks up" the wallops without failing where ordinary kraft breaks.

WONDERWALLS pack faster, handle easier and stack firmly, too. They add up to greater efficiency and lower costs. And—best of all—they don't cost any more than old-fashioned bags. Let us include a trial shipment of 5,000 WONDERWALLS in your next order.

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority.*

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BPA
MEMBER BUSINESS PUBLICATIONS AUDIT

The national business magazine for the fertilizer and pesticide industries, FARM CHEMICALS, serves primarily those persons responsible for management, marketing and production. It has a qualified circulation for selected executive and supervisory persons within specified segments of these industries, as well as in certain closely allied fields. Subscription rates to all others are: in the U.S., its possessions, Canada, Cuba and Panama: $6.00; in other countries: $7.50. Single copy 50 cents. Established in 1894 as *The American Fertilizer*.

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FARM CHEMICALS

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THE COVER PICTURE

Theodore Nowak, author of the foundation article in our new marketing approach ("Keystone of Future Profits," page 14), is pictured talking over a phase of market analysis with several of his colleagues at Alderson Associates, Inc., Philadelphia.

118836

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SOHIO / hub of the highballers

Center of 5 rail systems puts Sohio products plant-side fast . . . dependable, low cost, convenient

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SOHIO

LETTERS

FC MARKETING EMPHASIS

Memphis, Tenn.

Dear Sir:

. . . Your emphasis on the *Marketing* of agricultural chemicals appeals to me because "marketing" connotates "education." There exists a continuous need to tell and show the consumer how our chemicals will benefit him for, unless a man can see or comprehend the benefit, he has no interest and he does not buy! Without the sales—and a reasonable profit—the dollars needed for research, production and distribution are difficult to justify. It boils down and back to the point that marketing is basic and essential to the industry.

It is heartening to discover that so much interest in this subject has been conveyed to you by your readers. My thanks and congratulations for your cognizance of subscribers' needs and for the prompt follow-up.

Sincerely yours,
E. G. OSBORNE
Agricultural Chemical Specialist
DIAMOND ALKALI CO.

FARM PRICE SUPPORTS

Minneapolis, Minn.

Dear Sir:

In the November issue of FARM CHEMICALS you had a short article on farm price supports. In your opening paragraph you imply that the study by Dr. Walter Wilcox is unquestionably correct. His figures no doubt are right, but his interpretations aren't necessarily right. He has made one assumption on which his entire interpretation rests and that is the assumption that production would have been the same with or without price supports. If supports hadn't been present, production patterns most likely would not have been the same as they were with supports.

It also seems to me that there is an implication in the article to the effect that support prices have created buying power on the part of farmers. Isn't it possible that if farmers had produced according to effective demand, that production would have changed and that sales to farmers would have been just as great, although they may have been somewhat different in nature.

You say we have a million and a half marginal farmers and another million and a half that would sink into that marginal class if the buoyancy supplied by subsidies was removed. There is some question in my mind whether it's desirable to keep these marginal or near marginal farmers on the land. Many such people have moved from farms and by doing so, have substantially improved their standard of living. Most often the farms that they leave are absorbed by a neighbor or neighbors, thus improving their standard of living. Subsidies that prolong sociological problems can't do much good for the overall standard of living in this country.

Your article was good and it did bring out some facts that may not generally be known. However, to assume that Dr. Wilcox's interpretation of those facts is entirely right, is certainly questionable.

Sincerely,
CARL R. AMSTRUP
Assistant Director
Agricultural Department
F. H. PEAVEY & CO.

We asked John Harms, FARM CHEMICALS *Washington Bureau Chief, to answer Mr. Amstrup's sound and welcome letter. The answer follows.—Ed.*

I agree that Dr. Wilcox's interpretation is subject to debate. But the fact that he is a highly-regarded economist advising congressional Republicans and Democrats alike makes his interpretation important. And the fact that he is the only economist in Washington, and one of the very few in the country, who has attempted to put price supports in what he considers a more reasonable light, certainly makes it news.

Farmers, industry and consumers have been offered a steady diet of one set of facts—those that tend to drum up support for what government believes they should have. Is it not conceivable that official over-emphasis on one set of facts—without mention of other possibilities—could be detrimental to an industry selling the farm market?

Our purpose in presenting Dr. Wilcox's thesis was to suggest that industry ought at least to consider some of the other sides of the price support situation, on the basis that sound judgment on government actions can only be made with a full set of facts. Our function is to try to provide all sides of an issue—to enable industry to make its own value judgments.

Thank you for taking the time to raise this point.

Yakima, Wash.

Dear Sir:

In your November issue of FARM CHEMICALS you carried an article on farm price supports . . . Enclosed is a typed petition for what we feel is a new approach to the farm situation. We have shown this to a number of chemical salesmen and found each one of them greatly interested in this possibility. We have also found considerable interest from department stores, grocers, automobile companies, etc., and in view of this great interest we thought we might forward it to you for your consideration.

Very truly yours,
R. E. JONES
General Manager
NORKEM CORPORATION

PETITION FOR THE BETTERMENT OF THE FARM SITUATION

IN VIEW OF THE CRITICAL NATIONAL FARM SITUATION THE UNDERSIGNED PETITIONERS WISH TO EXPRESS A DESIRE FOR THE FOLLOWING CHANGES IN THE NATIONAL FARM POLICY

1. That all subsidies to farmers be *curtailed* at once.
2. That all money previously allocated to the farm subsidy program be diverted to a subsidy payable to the agricultural chemical salesman.

A. This change would, in effect, allow the farmer to till his land *in its entirety.*

B. Being able to farm *all* his land would give the farmer little or no time to complain about the present situation.

C. Further, the farmer would be *free of all* contact with agricultural salesmen, and would have *all his time* free to spend in the production of farm crops.

D. Through this lack of contact the national farm production would be *reduced to an alarming degree.* Farm surpluses would immediately become a thing of the past.

E. *Farm employment* would rise at once due to disappearance of chemical benefits previously enjoyed.

F. Last, but not least, it would allow the agricultural salesman to enjoy the full benefits of occupational security with none of the competitive worries of the present national situation.

This one fooled us for a moment. How about you?—Ed.

Laurel, Maryland

Dear Sir:

. . . Everyone respects your journal and its activities very highly; of course, we in wildlife work know how very important farmers, their activities and philosophies are in determining the status and well-being of wildlife.

Sincerely yours,
JOHN L. GEORGE
Biologist
Fish and Wildlife Service
U. S. DEPT. OF THE INTERIOR

NOVEMBER ISSUE

Washington, D. C.

Dear Sir:

. . . I feel your staff should be complimented on the presentation of my table on pesticide trends in the November issue of FARM CHEMICALS.

Yours very truly,
HAROLD H. SHEPARD
Staff Specialist
Commodity Stabilization Service
U. S. DEPT. OF AGRICULTURE

Washington, D. C.

Dear Sir:

The recent issue of FARM CHEMICALS commemorating NAC's Silver Anniversary was an excellent presentation and one that will long be remembered by all our members.

Speaking for NAC may I express our appreciation to you for a job well done.

Cordially yours,
L. S. HITCHNER
Executive Secretary
NATIONAL AGRICULTURAL CHEMICALS ASSOCIATION

A section of Hudson's Multiwall design facilities, the largest and most experienced in this country.

THE ODDS are 9 to 1

you can increase your sales through a Design Improvement

FIELD REPORT

TO: B.D.

RE: New Bag Design for [redacted]

Brought the new multiwall design to their PA, Mr. [redacted] today. He was so pleased with it that he took it right up to Mr. [redacted], their president, who was tickled with it. He especially liked the idea of simplifying the design, thus reducing his costs. At the same time, he agreed that we had greatly improved appearance, strengthened identification, and brought out his true selling points in much better way. He now considers the bag an "ace salesman", and praised the PA for getting such a fine design at no cost to his company.

Hudson Bags increase your sales — cut your costs!

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WASHINGTON VIEWPOINT

▸ *Commercial biological insect control begins. Thuricide temporarily exempted from tolerance.*

▸ *Conservation programs continue a big issue. Tug-of-war develops between ACP and CR*

▸ *Odds for putting TVA on a competitive, self-financing basis improve, but veto clouds the issue.*

The new field of biological insect control now has been officially launched on a limited commercial basis. This comes with the first federal sanction of a microbial agent for use on food and forage crops.

Food & Drug Administration has extended a temporary exemption from tolerance to Thuricide. Active agent of Thuricide: live spores of the micro-organism *Bacillus thuringiensis*. The exemption runs for one year, during which time distribution will be made to selected farmers in 16 states, Puerto Rico, Hawaii, and Australia. If no "questions" arise during that time, FDA indicates it will give clearance for general commercial use.

Exemption from tolerance is based on experiments showing that there is no hazard to health, nor to animals and fish. Thus, no residue problem—since residues are not known to be harmful. Insects do not build immunity. Similar in action to milky disease bacteria used for Japanese beetle control, this bacterium differs in that milky disease is applied only to the soil, not to crops.

Price has not been set by the distributor, Bioferm Corp., Wasco, California. But Bioferm says: "Most of the dosage levels so far recommended are in a range that will allow Thuricide to compete with insecticides that are used for the same purposes."

Initial use is against leaf-eating insects. Such as the imported cabbageworm, cabbage looper, diamondback moth larvae, and alfalfa caterpillar. For example, the recommendation against alfalfa caterpillar is ½ lb. spray per acre.

The process: The culture of *B. thuringiensis* is brought up through fermentation equipment with full facilities for agitation, aeration, pH and temperature control. When growth of the culture and sporulation is complete, spores are removed from the spent nutrients and are dried. The final dry spores are ground and mixed with an inert diluent to potencies ranging from 100 million to 10 billion spores per gram, depending upon intended use.

Pesticide and antibiotic residues in milk have been surveyed nationwide by the Food & Drug Administration during the past few months. FDA wants to find out how much, if any, of these materials get into the milk supply.

Report on the survey findings is not expected for several months. Initial tests were made at milk plants. If traces are found, inspectors go to the farm to locate source of contamination.

Inspectors expect to find traces of both types of chemicals. If so, it'll add to rising public concern over the effect of modern chemicals on humans, wildlife and fish.

Farm programs will continue to be in transition this year. Congress returns to Washington with a lopsided Democratic majority, loaded with young blood injected by the November election. The ranks of the liberals have been swelled, and this means big efforts to bring about more direct federal action in agriculture.

For its part the Administration not only will strive to stem the tide of bigger farm programs, but harness the consumer vote to bring about smaller federal farm programs.

Upshot: Farm chemicals markets won't be affected in 1959 by congressional action taken this year. If big changes are made, the effect will be delayed to 1960 and beyond.

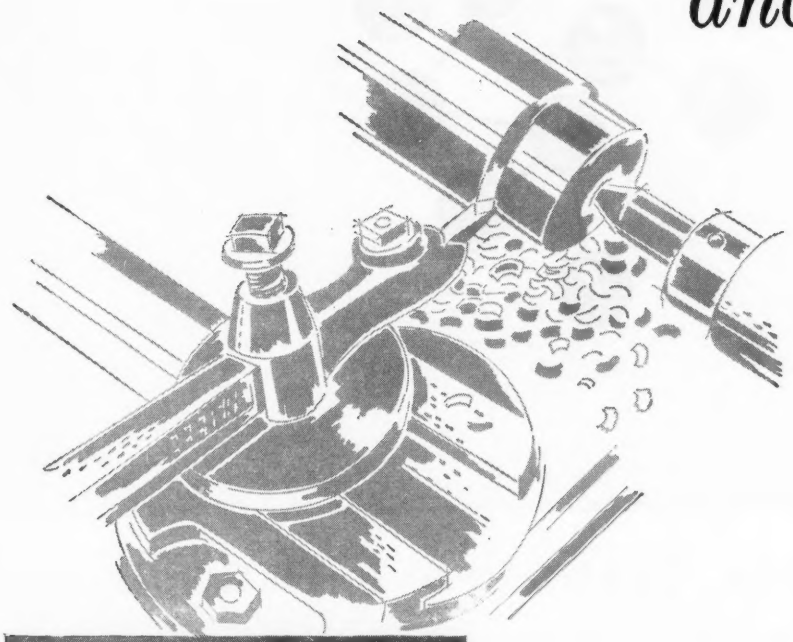
Conservation programs again will be a big issue this year. One of the highlights now developing is a tug-of-war between the Agricultural Conservation Program (ACP) and the Soil Bank Conservation Reserve. ACP pays part of the cost of installing conservation on farms, the CR pays annual rent on retired land plus a share of the initial cost of installing conservation on that land.

Confronted with record federal farm spending, the Administration wants to cut the $250 million annual ACP program by about $100 million—by dropping payments for so-called temporary practices such as fertilizer and lime applications. On the other hand, it wants increased funds to sign up more land in long-range Conservation Reserve retirement. By shifting

SULPHUR

ONE OF THE FOUR STRONG PILLARS OF PROCESSING

SULPHUR *and* STEEL



This fact may not be too well known: the steel industry consumes about 7% of all the elemental Sulphur or Sulphur existing in the form of sulphur gases, etc., used in this country. Most of this Sulphur serves the steel industry in the form of Sulphuric Acid where it is used in pickling steel products but also to a considerable extent in plating them. And certain machine steels carry an appreciable amount of 'planted' Sulphur to impart desirable machining qualities. Seven percent of the total elemental Sulphur and equivalent Sulphur tonnage is quite substantial. Its use in steel emphasizes the importance of Sulphur to our whole economy. Much of this tonnage of steel-used Sulphur starts out at our mines in Texas where we serve as a major supplier of Sulphur to the manufacturers of Sulphuric Acid.

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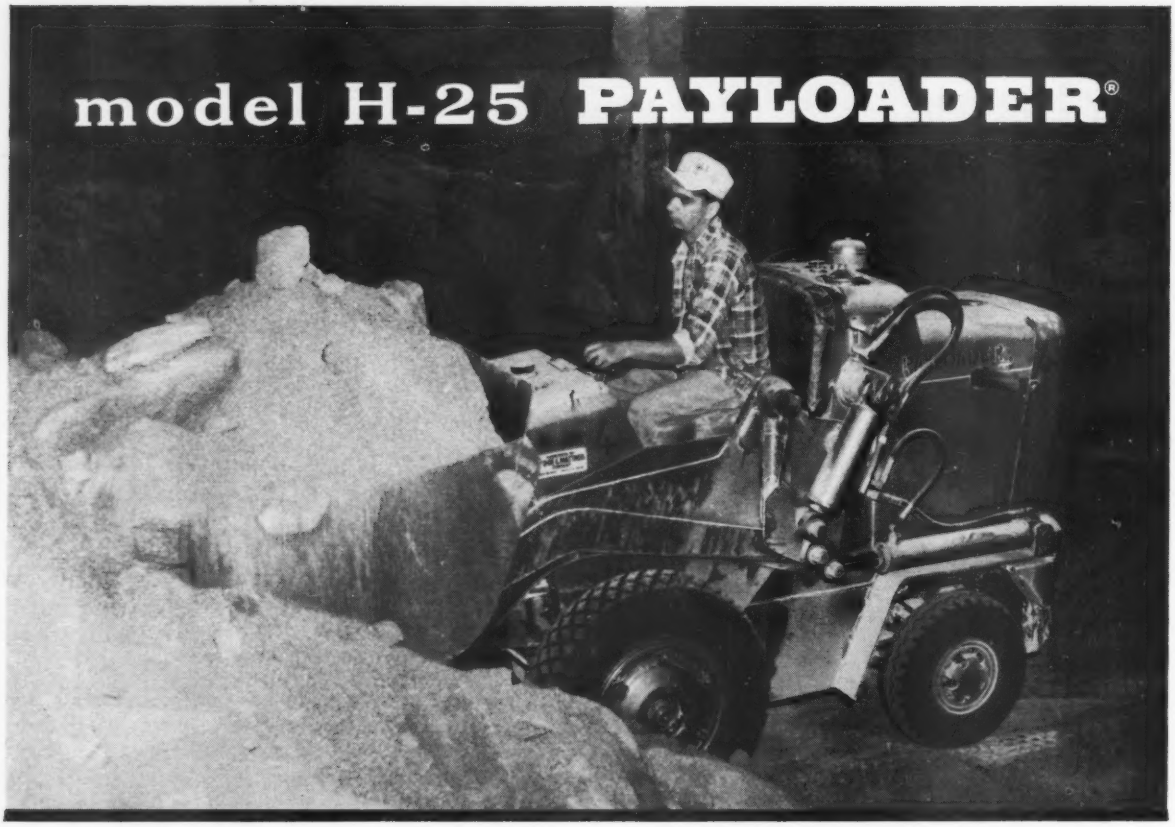

Competitive Tests Prove H-25 Best

Eastern States Farmers Exchange, Inc. purchased four "PAYLOADER" units as a result of competitive tests conducted at their Cambridge, Mass. plant. In these tests, a Model H-25 "PAYLOADER" moved material at a rate of 90 cu. yds. per hour on a 150-ft. (one-way) haul distance — outproduced the other tractor-shovels in the test.

This fertilizer manufacturer serves Pennsylvania, Maryland and the New England States . . . has four plants and a fifth under construction.

One way to be sure you buy the very best in tractor-shovels is to conduct competitive tests in *your own* plant under *your own* conditions. Like Eastern States Farmers Exchange, you'll find that such tests help to cut through the confusion of conflicting claims.

More For Your Money

There are many reasons why the Model H-25 will dig, carry and deliver more yardage or tonnage with lower operating and maintenance costs than anything in its class. It has more breakout force, 4,500 lbs.; equal or greater carrying capacity, 2,500 lbs.; the shortest turning radius, 72 inches; power-shift transmission with two speeds forward *and* reverse; power-steer; exclusive power-transfer differential.

An Ounce of Prevention

The H-25 has been engineered to provide extraordinary protection against dust and dirt damage: triple air cleaner — precleaner and two oil-bath air cleaners; cartridge-type oil filter on all three oil systems; sealed, self-adjusting service brakes; parking brake enclosed in transmission; special grease and oil seals on all vital points.

Why not find out what a Model H-25 can do on your work? Ask your Hough Distributor for a demonstration, and ask about Hough Purchase and Lease Plans too.

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Send data on new H-25 "PAYLOADER"

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Title _____

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State _____

1-A-1

WASHINGTON VIEWPOINT

$100 million from ACP to CR, it is figured, the government will get more genuine conservation for its dollars—and help take surplus land out of production.

Odds are that Congress will provide extra money for the Conservation Reserve, at the same time refuse to cut ACP.

TVA on a self-financing basis is the goal of an increasing number of lawmakers. First hint that this will be a big issue this year came recently when TVA self-financing was set forth as a goal for the Democratic majority by the Democratic Advisory Council. DAC members include Harry Truman, Adlai Stevenson, and other party, non-congressional big-wigs.

Odds for putting TVA on a competitive, self-financing basis now are better than in recent years. But the veto clouds the issue.

New wheat program will be hotly debated. More than a half-dozen different approaches to the Number 1 surplus problem are being pushed. Secretary Benson wants to break through the present 55 million-acre planting floor, and reduce price supports. Wheatmen will push for a variation of two-price plans—support for domestically-consumed wheat, none for exports.

Odds favor new wheat legislation, with farmers given the opportunity to make the final decision in referendum.

New tobacco program to be pushed by Secretary Benson aims primarily at the price support level. Tobacco is the only commodity still propped at 90 per cent of parity. No further cut for quality tobacco acreage is likely.

Odds favor new tobacco legislation—but whatever comes, it's not likely to change the demand for fertilizer.

Corn and cotton growers have voted for bigger acreage (and lower price supports) in recent referendums. It means 8–10 million acres added to production between them.

Outlook: A bigger base for potential fertilizer and pesticide sales—particularly in view of the increasing price-cost squeeze at the time when farm chemicals are holding relatively steady.

Refusing to accept defeat, fourteen Long Island (NY) residents have appealed the lower court's June 23 decision on the historic "DDT Case." (*July, 1958*, FARM CHEMICALS). Filing their appeal October 28, the landowners will again attempt to halt the U. S. Department of Agriculture and New York State from aerially spraying DDT against the gypsy moth.

The appeal will be heard in the U. S. Court of Appeals for the Second Circuit (New York City). Those closest to the case indicate it will not be heard at the least until mid-spring. It is not known now on what grounds the appeal is being made.

What's Coming Next Month

It's a new year. You're looking for new ideas—new ways of doing things. The one sure way of getting the jump on your competitors in 1959 is to read the *new* FARM CHEMICALS. Our new marketing emphasis is no flash in the pan, we assure you! Latch onto the terrific ideas presented in this issue . . . then watch for articles like these coming up next month . . .

■ MUSCLE IN YOUR MARKETING

A leading marketing authority takes apart wasteful marketing practices in the fertilizer industry and shows how a fully integrated marketing program can achieve maximum success. Points covered: maintaining a "fair price" level . . . creating a worthwhile marketing objective . . . the seller's responsibility . . . and many others.

■ THE FUTURE OF WET-PROCESS

Here is one of the most outstanding articles ever offered by FARM CHEMICALS. In the next four or five years, a recognized phosphates authority recently told this magazine, wet process phosphoric acid (phosphatic fertilizer solution) will become very important in processing fertilizers. To date, the problem has been how to "clean it up." This article will discuss the background of "P.F.S.," then will bring out what you can expect it to do.

■ NON-CHEMICAL INSECT CONTROL

Revolutionary new approaches to controlling insects are coming, in fact they are here! This FC Special Report will bring you up-to-date on vital developments which could have a profound effect on the pesticide industry.

■ FUNGICIDES TODAY

A well known plant pathologist presents the fungicide situation: what it is now, the story of developments that have created it, trends, . . . with a fresh look into why the specificity—broad spectrum question is so complex.

. . . in the new

FARM CHEMICALS BPA

WHAT'S DOING IN THE INDUSTRY

NEW SUNOLIN UREA PLANT

SunOlin and Montecatini Soc. Gen. of Milan, Italy, on January 2 signed a license agreement for use of the Fauser-Montecatini process in a urea plant to be built at North Claymont, Del.

Engineering: N. W. Kellogg with Montecatini's technical assistance. Capacity: 73,000 short tons a year of urea prills and crystals.

IMC ESTABLISHES LAWN & GARDEN DEPT.

On January 1, International Minerals & Chemical Corp. began operating a new Lawn and Garden Dept. in its Plant Food Div.

John D. Zigler, general manager of the division, said the department will concentrate on promotion of a new lawn fertilizer called Thrive. Jack G. Eisinger has joined IMC to be sales manager for the new department.

NEW AAI OFFICERS

S. C. Smith of Uvalde, Tex. was elected president of the Agricultural Ammonia Institute at its eighth annual convention in Chicago, Dec. 3–5. Carl Bauserman, South Michigan Nitrogen Co., was named first vice president; C. J. Struble, Standard Oil Co. of Indiana, second vice president; Hampton Pugh of Pugh Gin and Fertilizer Co., re-elected secretary; and David H. Bradford, Jr., Mid-South Chemical Corp., re-elected treasurer.

THIS MONTH'S

Meeting Highlights

Agricultural Aircraft Association Convention

Senator Hotel, Sacramento, Calif.

Jan. 22—California Aeronautics Commission Meeting. Agenda includes discussion of proposed federal and state aviation gas tax; creation of "Antenna Farms" for tall towers; state aircraft tax and requirement of financial responsibility for owners of aircraft.

A legislative panel is planned, followed by AAA Attorney J. A. Montgomery, Jr.'s report to the industry. Dr. Ralph Glasser will discuss "Practical Aspects of Safe Handling of Pesticides."

Jan. 23—An insurance panel is scheduled, as well as a "Comparison of Use of Agricultural Aircraft in U. S. and Abroad;" a report by AAA President James B. French; "My Competitors have Gone to Hell, I'm Next" by John F. Neace, Neace Aviation; a closed business meeting and banquet with Col. Gregory "Pappy" Boyington, USMC (ret.) as guest speaker.

Jan. 24—Topics planned include "Safety with Chemicals;" "The New FAA and What it Means to You;" "Wage and Hour Law and the Aerial Applicator;" "Safety in '59;" and "1959 Aerial Tanker Program." Films will be shown of the Swathmaster Distributor and Kellet Autogiro and there will be demonstrations of aircraft and equipment.

Southern Weed Conference

Washington-Youree and Captain Shreve Hotels, Shreveport, La.

Jan. 21—Richard Behrens of the University of Minnesota, conference president, presides at the a.m. general session. Speakers and their topics are: Eugene Butler, editor of *Progressive Farmer*, "Chemicals in Southern Farming of the Future;" John W. Mitchell, head of USDA's Growth Regulator and Antibiotic Laboratory, "Recent Developments in Growth-Regulating Chemicals;" and L. M. Stahler, U. S. Borax and Chemical Corp., "Research and Marketing Weed Control by Industry."

In the two p.m. sectional meetings—on Control of Woody Plants, and Soil-Applied Herbicides—technical papers will be read by government and industry scientists.

Jan. 22—Sectional meetings on Aquatic Weed Control, Extension Programs on Weed Control, Public Health Aspects of Weed Control, and General Weed Control.

The p.m. general session will include a report of the research committee and a demonstration of a centrifugal sprayer for invert emulsions.

Jan. 23—Sectional meetings on Fundamental Research, Weed Control in Grain Crops, and General Weed Control.

More information is available from Public Relations Committee, Southern Weed Conference, Suite 603, 1145–19th Street, N. W., Washington 6, D. C.

FERTILIZER SALESMEN'S TRAINING SCHOOL IN FEB.

A Fertilizer Salesmen's Training School, designed to improve sales techniques through use of the latest scientific and economic information affecting farmers, will be sponsored by the National Plant Food Institute in Columbus, Ohio, on February 4, according to Dr. Russell Coleman, NPFI vice president.

Sales representatives of NPFI members and non-members with operations in Ohio are being invited to attend, the association reported.

Subject matter will include

1) What's the Customer Like?
2) Why Does the Customer Need Our Product?
3) What Sales Tools are Available?
4) How to Sell Fertilizer More Effectively.

NAC PUBLISHES "OPEN DOOR TO PLENTY"

Open Door to Plenty, the facts book of the pesticide industry, has been released by the National Agricultural Chemicals Association.

The 64 page illustrated booklet tells the story of pesticides and how they are used to protect food, property and health.

Progress already made in improving man's mastery over pests of all types is reviewed, as well as future benefits that can be expected as research and education continue.

Single copies can be obtained free of charge by writing National Agricultural Chemicals Association, 1145 Nineteenth Street, N. W., Washington 6, D. C.

In "Talk About Fertilizer" on page 25 of the December FARM CHEMICALS, two of the three panel members were not identified. This was not due to the rather safe assumption that many readers would not require identification for these spokesmen. **Dr. M. B. Gillis,** director of research, International Minerals and Chemical Corp., was so identified. But we failed to mention: that **Dr. Edwin Cox,** a former vice-president of Virginia-Carolina Chemical Corp., is now a farmer and consultant to VC and several other corporations, and a partner in Lauren B. Hitchcock Associates of New York; and that **Dr. Eugene D. Crittenden,** former director of research for Nitrogen Division, Allied Chemical Corp., is now consultant for long range research planning. Panel moderator **Dr. Vincent Sauchelli** is NPFI chemical technologist.

3 REASONS WHY YOUR CHOICE SHOULD BE

TREBO-PHOS*

Cyanamid's quality triple superphosphate

1 **GRANULATION**

Trebo-Phos in typical commercial runs is producing high analysis mixed fertilizers with excellent granulation.

2 **AMMONIATION**

Ammoniation easily achieved up to 4.6% and higher with suitable equipment *without* uncomfortable ammonia fumes. Physical condition of Trebo-Phos makes possible maximum and uniform absorption of ammonia.

3 **CYANAMID SERVICE**

Cyanamid's new, ultra-modern triple plant has high storage capacity for Trebo-Phos. Inventories are maintained at levels that let Cyanamid fill your orders promptly. Cyanamid traffic experts are at your service to assure the most prompt, economical deliveries. Cyanamid technical representatives are available to help you solve production problems *in your plant.*

CYANAMID

WRITE, WIRE OR PHONE FOR FULL INFORMATION. OUR REPRESENTATIVES WILL BE GLAD TO CALL. NO OBLIGATION ON YOUR PART.

*TRADE MARK

American Cyanamid Company,
Agricultural Division,
Phosphates Department,
30 Rockefeller Plaza, New York 20, N. Y.

KEYSTONE

By THEODORE NOWAK

SO THE FARM CHEMICALS industry has a bright tomorrow. But what about today? How can the industry withstand and overcome the many current pressures, and place itself in a strategic position for capitalizing on the "golden 70's?" What immediate actions can be taken to place the industry on a firm foundation for the future?

There can be little disagreement that the industry's immediate and basic problem is *not* how to produce at a lower cost, but *how to increase sales volume profitably.* The entire distribution chain between the manufacturer and the farmer must direct its major efforts toward building markets—not additional production capacity. Attention must be given to all the basic marketing activities necessary not merely to place the industry's products in the farmer's hands, but, ideally, to promote and bring about his use of sound principles and practices in applying those products to his soil, crops, and livestock. Faced with the increasing complexities of farm management, the farmer desires—and eventually will demand—a full range of technical services from his suppliers. The farm chemicals industry will be called upon for much of this technical assistance.

Only through concerted effort by all concerned to adopt a marketing philosophy—to build sales programs to serve the farmer—can the industry alleviate its current ills and look forward to a profitable era in the next decade.

This marketing philosophy for the farm chemicals industry takes into consideration all activities that contribute to helping the farmer achieve improved products, decreased costs and higher income.

Experience shows that action taken at any level between the manufacturer and the ultimate user to

Members of the farm chemicals industry who make the transition to a marketing orientation today will be the profit leaders of tomorrow. Production capacity in the fertilizer and pesticide industries has, in recent years, often been in excess of market demand.

This situation has been accompanied by large investments in inventories, a high ratio of accounts receivable to sales, and unstable price levels—three factors that have combined to bring about a low rate of profit and return on investment. Add to these conditions the vagaries of the weather, trends in insect population (much less predictable than the nation's human population), and the fundamentally seasonal nature of farming, and you have an environment that is not a business utopia for operating executives.

What about future market demand for farm chemicals? All available forecasts point to a greatly expanded demand in the next 10 to 20 years. This expansion will come about partly as a result of expanding population. Various estimates indicate that by 1975 there will have been about a 35 per cent increase in the U.S. population—from approximately 175 million today to approximately 235 million in 1975.

Besides the expanding population, another factor will be at work expanding the market for the farm chemicals producer. Farm acreage estimates indicate that any necessary increase in agricultural production will come about with but a relatively slight increase in the acreage of land under cultivation. Additions to valuable farm land by irrigation are close to being counterbalanced by the loss of farm land to residential and industrial developments and highways, accompanied by the retirement of marginal land.

Food requirements of the expanding population, therefore, must be met largely by increasing the productivity of existing farm land by means of intensified and more skillful use of fertilizers and pesticides.

This article is published by FARM CHEMICALS as the foundation of FC's new editorial program emphasizing marketing. In coming months FC will bring you articles showing practical, timely applications of these proven principles.

Theodore "Ted" Nowak (left) is a Principal in the firm of Alderson Associates, Inc., marketing and management consultants in Philadelphia. His work with his company's clients is primarily in the field of systems and procedures. Here his responsibilities include such areas as order processing, production planning and sales analysis.

OF FUTURE PROFITS

Building your service on market knowledge is the way to build sales volume profitably

benefit the user contributes to market expansion. It broadens the number of users and increases intensity of use. Few will disagree that substantial opportunities exist for expanding the number of users of the farm chemicals industry's products and for increasing the intensity of their use.

What are the elements of such a market-oriented program? Among the more important of these we may list: 1. Selling—which is used here in the broad sense to include personal solicitation, all forms of advertising and sales promotion, as well as public relations; 2. Product development—types, quality, standards; 3. Transportation, warehousing and inventory management; 4. Packaging; 5. Pricing; 6. Determination of market needs.

MARKET FACTS—PLANNING KEY

Of these activities the last is perhaps most important in planning for higher sales at desirable profit margins. In bygone days, when business was smaller and less complex, the typical supplier knew the majority of his customers intimately, but today there are several levels of processing and handling between the basic producer and the farmer. Thus, today, many in the distribution chain have little or no contact with the ultimate users of their products. So they have to rely upon secondhand information from others in the chain to get a picture of the success with which their products meet the needs of the market. As the industry continues to expand, the factual foundations which are necessary to support it will have to be strengthened by the accumulation of detailed, intimate knowledge of all facets of the market.

Statistical information on the farm market is available from federal, state and some local government sources. Much of it is crying to be used—in the development of sales potentials and quotas, and determination of significant trends. Using such data, supplemented with survey information on farmers' product practices, opinions and knowledge, will do much to improve management planning and the marketing of farm chemicals.

Future policies and programs, to be successful in carrying the industry into the "golden 70's" will, more and more, need to be based on a thorough knowledge of the market. To illustrate, the following types of questions would need to be raised and answered in developing a sales program to meet market needs:

1. How many farm customers and prospects are there for my products?
2. How many acres, and what types of soil, do they control?
3. *What are the quantities presently consumed in my marketing territory for each major product group?*
4. How is this volume distributed geographically, and how is it concentrated in the total number of farms in the area?
5. What is my percentage share of the existing market for each of my major product groups?
6. *How close to typical consumption patterns by product group are my own sales patterns in my marketing area? Are the variations indications of forward thinking, or of slowness in adapting to the shifting needs of the market?*
7. Is the composition of crops in my marketing area changing in a manner which would indicate an opportunity to shift product emphasis ahead of competition?
8. *What is competition doing that is new or different and what impact is this having on the market and on my volume?*
9. How is my network of distributors and/or dealers situated in relation to the patterns of farm concentration in my marketing area?
10. What are the farmer's needs, practices, attitudes and prejudices? What is the extent of his knowledge regarding each of the major classes of farm chemicals products in which I am interested?
11. *With this knowledge of the farmer, what will be required to improve our services to him to our mutual benefit?*

NON-PRICE SALES APPEALS

Only with such information at hand can the marketers of farm chemicals be in a sound position to develop sales goals and programs realistically attuned to the needs of the markets they serve. Armed with the pertinent facts, marketing management can make intelligent decisions regarding: characteristics and quantities of products required, sales appeals which will be most effective in increasing usage, nature and level of services required, and proper levels of inventory—with the assurance that the entire program is realistically tailored to the requirements of the market.

As sales programs become more market oriented, *there are more tangible benefits to the farmer.* These benefits will provide the only possible sound basis for the development of *non-price sales appeals.* This alone can be the bridge to improved financial health of the farm chemicals industry. The other alternative, competition oriented primarily to pricing, leads to further deterioration of an already inhospitable marketing climate. ▲

MARKETING

CREATIVE PRICING

By FRED C. FOY*

This fast-moving analysis goes to the heart of decisions facing today's farm chemicals management in handling problems encountered on the road to price stability

THE ROLL CALL of those in favor of sound pricing includes just about everyone who is in favor of motherhood. And, naturally, every good businessman places himself against cutthroat pricing almost as quickly as he votes publicly against sin.

The real difficulty lies in defining that middle gray area that always seems to exist between principle and practice—between basic strategy and shifting, horseback tactics.

For example, are we following a consistent, sound price policy if we make certain, "unpublished" concessions to a few customers? In the absolute sense, we certainly are not, because every concession is a retreat from our stated policy. But we all know the pressures that prompt one to rationalize these exceptions. It's so easy to feel that they do no great violence to our policy because these customers are "deserving." Besides, it is always possible to persuade ourselves that if we don't make the concession, our competitors will.

My assignment can best be fulfilled, I believe, if you join me in exploring this nice "gray area" between our declarations of belief in sound pricing policy and our actual performance in the arena of pricing practice. Let's say that I am calling on all of us to take a close look at our behavior in the price field, and then ask ourselves whether or not it is consistent with our behavior in other phases and activities of our business.

First, as a launching pad for this discussion, I am sure that all of us agree that every well-run business should have a price policy. Businessmen give a great deal of thought and planning to their engineering, manufacturing, advertising and sales promotion policies.

Certainly the same kind of careful study and planning ought to go into the formulation of price policies that best serve the long term objectives of a business.

I call pricing based on such a well-formulated policy *creative pricing*. There are probably better ways of saying it, but this term comes pretty close to describing what I believe to be the true function of pricing.

The distinctive feature of *creative pricing* is that it is guided by purpose, planning, and method. It is not based on hunches, emotions, or misinformation. Every major price decision should stem from a consideration of all the factors involved, not just those that seem the most imminent or the most pressing. In short, *creative pricing* doesn't just happen; it requires a carefully planned policy approach.

Admittedly, this is not as simple and clear-cut as it sounds. There was a time when a businessman could say that his pricing was based on three simple objectives: 1) market his goods; 2) recover his costs; and 3) generate a "reasonable" return on his investment.

That is still the starting framework. But this meager framework does NOT convey the complex relationship between prices and the many other elements of competitive strategy employed in modern business. NOR does it get to the heart of the pricing problem plaguing most industry today—that price play an essential role in supporting long-term progress and growth.

CONSIDER PRICE A VEHICLE

Let's look at price as a vehicle for moving our product. Certainly, a price has to be shaped to the realities of the market, to the competitive nature of the area in which we are working, and to the demand level of the groups we are trying to sell.

But to put all of our competitive eggs into the price basket, I think you will agree, is short-sighted at best and suicidal at worst.

We have so much more than price to sell. We have design and application features; availability; quality refinements; use convenience, modern packaging; and so on. These are real values and competitive factors; most of them are as important or more important than price in creating demand. Compare if you will, the frozen foods and ready convenience items of the modern supermarket with the bulk foods of the cracker-barrel store. This comparison shows that to millions of consumers, the new elements of use value have proved to be more attractive than price.

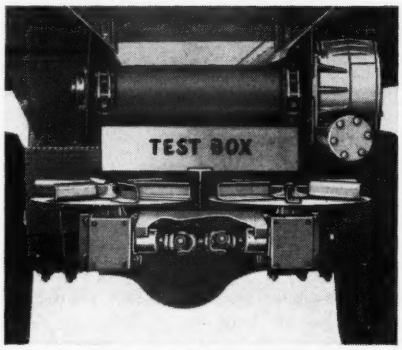
However, the most serious shortcoming of price-only competition is that it inevitably brings a slowdown or

* *Chairman of the Board and President of Koppers Co.* *This talk was presented at the annual meeting of the Chemical Specialties Manufacturers Association, Dec. 8–10, 1958, in New York City. Adapted with the permission of Koppers Co.*

NEW LEADER

Engine Driven Combination Spreader

L-32S



This Exclusive NEW LEADER Metering Device Accurately Meters from 100 lbs. per Acre and Up!

The test box slides into position above the spinners. The feedgate is set—the spreader driven 50 ft.—the material coming off the conveyor into the test box is weighed—and calibrated in pounds per acre on the scale dial. Takes the guess work out of spreading . . . and more accurate spreading sells more fertilizer! Be sure to order this attachment with your rig.

The Most Accurate Lime and Fertilizer Spreader Made!

- **12.5 h.p. engine drives twin spinners at a constant rate for smooth, uniform spreads!**
- **24″ conveyor driven by PTO or drive shaft drive for more precise per-acre requirements!**

The New Leader L-32S gives not only the accurate performance customers demand but unusual dependability and versatility as well. *Dependable* because a 6″ higher, more heavily reinforced body holds bigger loads, gives years of extra use. A rugged 24″ chain conveyor and 45° angle sides eliminate bridging, permit lower center of gravity. Sealed gears give a lifetime of trouble-free maintenance. Spreader can be equipped with a special heavy-duty, 4-ply rubber belt, riveted to an all-steel roller type conveyor . . . that lasts longer . . . prevents excessive stretch . . . and allows you to spread as low as 100 lbs. of material to the acre. Drive shaft drive available with cab controls . . . synchronizes conveyor speed with truck speed to stop "spreading skip" in muddy or snow covered fields. Two compartments (removable) also available. Front compartment with steel bottom dump doors. Rear compartment can be unloaded independently.

The New Leader L-22S with 7.0 h.p. engine available for lighter applications.

NEW LEADER L-42S Mobile Blender Accurately Blends and Spreads 3 Fertilizers at the Same Time!

Permits the operator to control both the amount of spread and ratio of 3 fertilizers depending on varying soil conditions! A 7 h.p. engine drives the twin spinners at a constant rate. A 36″ belt-over-chain conveyor is powered from a drive shaft drive and synchronized to truck speed.

NEW LEADER
SALES & SERVICE

Write for illustrated bulletin

HIGHWAY EQUIPMENT COMPANY
649 D. Ave. N. W. Cedar Rapids, Iowa

Our Business is S-P-R-E-A-D-I-N-G-!

stoppage of growth. This can be true not only for a particular industry, but for the nation's economy as a whole. The early automobiles might have been sold for considerably less than they were. But I suspect that if the automobile industry had tried to develop its markets on price alone, we would still be driving a variation of the Model-T.

Now let's take a quick look at the problem of recovering costs. The right price is supposed to get back all of the costs of making and marketing the product. But again this is not so easy. Because in our complex economy we have to go beyond the simple, self-evident costs—like labor, materials and so forth—and pay strict attention to a whole variety of indirect and invisible costs. I mean such costs as the deficiency in depreciation recovery; the price we pay for rapid technological obsolescence; and the recovery of research and development expenditures, including those that did not pan out.

If our pricing policy does not give weight to the recovery of all of these costs, the battle for future growth will be lost right at the cash register.

WHAT IS A "REASONABLE RETURN"?

After we have marketed our product and recovered our costs, we still have to generate a reasonable return on our investment. What constitutes a "reasonable" return will vary widely, depending on the industry and its area of operation; its state of development; growth potential; rate of obsolescence; and many other factors. But whatever the circumstances, the return should be sufficient to keep a company strong and flexible; enable it to pay its stockholders enough to hold them as well as attract new equity owners; and above all, make it possible financially to plan for growth.

That simple framework has become quite an order. Yet I sincerely believe that any pricing pattern must be guided by such considerations before it can operate to the long term benefit of a modern industrial enterprise. When we say that, we are saying in short that sound pricing must aim to satisfy the legitimate claims of the consumer, the worker, the investor—and, in addition, provide the seedcorn of progress. But how can such an aim have much realization unless we support it with the purpose, planning, and method of a constructive policy approach?

All of us recognize, of course, that every business policy has to withstand the day-to-day pressures of changing conditions. It is one thing to be a statesman in the ivory tower of theory, but I would be more than a little naive if I did not admit that the hurly-burly of competition often forces hasty decisions, pushes for adjustments, prompts temporary retreats, and invites other apparent deviations from a stated policy. But the less we lose the long view, the less we surrender overall strategy to the jumble of tactics, the more surely we'll move ahead toward our goals.

Now this is where we enter that "gray area" I discussed earlier. This is where we businessmen have to decide between the immediate promise of shortrange tactics and the slower but fundamental gains of long-term consistency. This is the area where we are tempted to backslide from the solid bases that are part of a constructive marketing pattern . . and shade off into definite, though masqueraded price-cutting. This is the area where creative pricing is born or busted.

And this is where it is possible to win the battles, but still lose the war.

This "gray area" is the happy hunting ground of a host of abuses, distortions, or in some cases the over-liberal applications of practices that have become a part of American business over many, many years. Let's look at some of them, not, of course, that they apply to any of us here today! Let's examine the ways in which they can make or break a sound price policy, stimulate or throttle an industry, boost economic progress or hinder its growth.

SOME TACTICS UNDERMINE SOUND PRICING

To get specific—the practice of offering generous credit is as American as ham and eggs. It has staked newlyweds to their first bed and put a television antenna on every third chimney. It has been a worthwhile method for starting a new enterprise, getting a new product on the market, or generating whole new industries. I'm all for that. But it is just because credit can be put to work in so many ways that it lends itself to easy abuse.

▶ My question is: *How easy does easy credit have to be before it becomes nothing more than a price concession?* It is hard to give a quick answer to a question like this. But all of us know that credit carried to an extreme degree is bound to weaken an industry's price structure and mess up its growth plans. Excessive credit may even lead to a deterioration of long-term demand or basic market strength.

Where special credit is extended generally to help market a new product, or to extend the applications for an existing product, the idea behind this form of marketing incentive is sound. However, somewhere along the line you need a cut-off point—you have to decide that maturity has been reached and that the new trade children must walk on their own feet. And when you do this, you have to be prepared for a scream or two.

Looking at the subject more generally, I would say that credit becomes a price concession to the extent that the seller absorbs costs to finance the buyer's purchases or inventories beyond what is established as a norm for that trading field. Or if he grants it to one customer and not to another.

Now let's run through a few more ways in which management can kid itself into not following a sound price policy.

▶ You know about *advertising allowances*, especially the automatic kind that amount to a fixed percentage of the sales involved. But do we insist on proof that the allowance was spent for advertising as intended?

▶ Here's another—*we let a purchaser order a theoretical carload so that he can qualify for the lowest price, but we informally agree that he doesn't actually have to take the whole carload at one time and that we will provide*

(Continued on page 56)

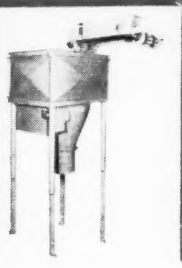
Appearance may be improved through better design, sharper color printing, reproportioning, or better choice of outside wall.

A frank discussion with us may result in a more attractive bag, reduced production costs and increased sales of your product.

When will you talk with our representative?

The Newest **KRAFTPACKER**

will handle any free-flowing material f-a-s-t-e-r, with more accuracy, than any bag filling machine of its type!



KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.
Daily News Bldg., Chicago 6, Ill.

Integrated mills at St. Marys, Georgia and Gilman, Vermont

Gilman PAPER CO.
• St. Marys Kraft Corp.
• Container Corp. Div.
• The Calhoun Corp.
• Kraft Bag Corp.

☐ We are interested in improving our bag.
☐ We are interested in your Kraftpacker.

FC

NAME OF COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____ PRINCIPAL_____

PRODUCT MFD._____

MERCHANDISING AIDS

PROMOTION

Second stage of IMC's 'full orbit' launched

Mr. Full Orbit is "This is Your Life" guest with Marketing Vice President Tony Cascino (left) introducing Robert H. Linderman, domestic sales manager for phosphate rock. Mr. Full Orbit is well-known radio-TV actor and announcer, Carleton Cadell.

IMC vice presidents, A. E. Cascino, marketing; Nelson White, potash, and George Moyers, phosphate, discuss training plans.

Merchandising kits and other new tools for use in "second stage" of Full Orbit are picked up by W. W. Chadwick, district sales manager of agricultural potash for IMC. L. W. Gopp, sales manager for phosphate chemical special product, left foreground.

"MR. FULL ORBIT," all decked out in a glistening space suit, was the subject of a simulated "This Is Your Life" program at a razzle dazzle "second stage" sales meeting of International Minerals & Chemical Corporation's Full Orbit customer service program, at IMC's spacious headquarters in Skokie, Ill., December 16.

At that time a new plan for nine regional two-day training meetings for 350 salesmen from 156 fertilizer companies was announced. Two new service manuals, "Using Credit Effectively" and "Insurance and Safety Programs" were introduced—to add to the six manuals already being distributed to fertilizer manufacturers.

Meetings start in Birmingham on January 5, and continue through February 3. Other cities at which meetings are scheduled: Shreveport, La.; Tampa, Fla.; Columbia, S. C.; Baltimore, Md., (two meetings); Cincinnati, O., Des Moines, Iowa, and Skokie, Ill.

What was the reason behind this bold move? Salesmen had *asked* for it. They specifically requested step-by-step help in conducting sales meetings.

Training teams for the meetings will be IMC sales and marketing executives and top salesmen from the field. They will cover subjects chosen by fertilizer companies as most important to them in their selling efforts. The agenda includes such general topics as prospecting for new accounts, sales approach, overcoming objections, sales closings, general sales tools, selling quality and effective use of selling time.

The December 16th affair included all the theatrics and glamour of the original launching of Full Orbit last May. Anthony E. Cascino, marketing vice president, introduced his "guest," Mr. Full Orbit, following his "descent" from outer space in a special space ship. A cinemascope of the complete story of full orbit was presented.

Thirty IMC salesmen had been given a "physical" —to make certain they were fit for space travel— following a tour of the spacious new Skokie headquarters. Then they entered a room where they were greeted by revolving lights, satellites, missiles, meteorites and multi-colored clouds—from which emanated wierd beep signals and other eery sound effects.

An attractive "stewardess" congratulated them on their being chosen for the "historic" flight into space and in a few moments there was a terrific roar, followed by an incredible display of colors flashing all about them. Through the dazzling display "travelers" could see 18 caricatures of IMC Full Orbit leaders peering at them.

The space ship commander briefed them on their "journey" and in what seemed to be an almost immediate transformation the "earthlings" lost all sense

of time as they entered the frozen ionic sphere. Then a series of meteoric explosions occurred, followed by the familiar voice of the author of Full Orbit. The spotlight was on Cascino and his guest from outer space, Mr. Full Orbit himself.

Getting down to earth with the facts, Cascino listed the accomplishments of Full Orbit. There were additional testimonials by R. H. Linderman, manager of domestic phosphate sales; Joseph Mealy, manager of the direct applications department, phosphate division; and Joseph McGarry, director of the public relations department.

Cascino said the program has exceeded expectations in its six-month introductory stage.

IMC salesmen introduced the program to more than 400 fertilizer manufacturers, he said, and distributed 8,000 of the six different specially prepared Full Orbit "how to" booklets. These manuals—based on an independent survey of fertilizer manufacturers to determine areas in which they needed and would welcome help—were written by experts on such subjects as market analysis, building and training a sales force, setting up effective dealer meetings and improving advertising effectiveness. Transportation problems and technical service are also covered in the original six manuals.

It was a historic day for Mr. Full Orbit as two results of his program were realized by all salesmen in attendance:

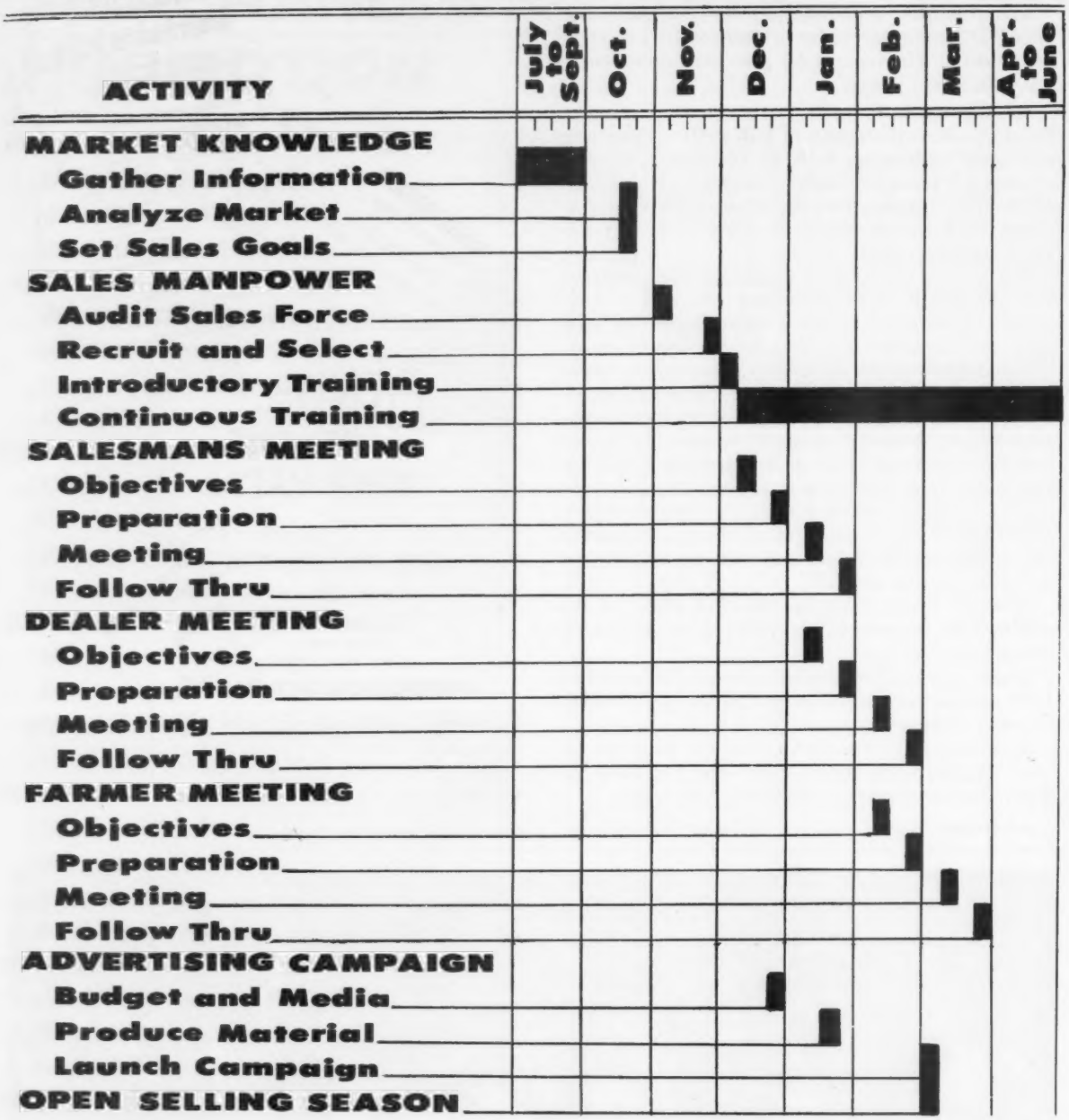
1) About 400 customers have been fully briefed by IMC salesmen on all phases of Full Orbit in a matter of about six months.

2) Salesmen are convinced that the program not only offers valuable services—but also Full Orbit has given them more prestige with their customers.

FARM CHEMICALS was told that a survey of IMC customers *indicated a definite improvement in recognition of IMC as a company that provides service*—a direct result of Full Orbit. *(Please turn to page 22)*

BLASTOFF! Wide-eyed salesmen watch IMC's Full Orbit go into second stage before their eyes. Special film and sound effects in training room gave realistic background for salesmen's introduction to new services, one of which, advertising help, is illustrated above.

HOW TO PLAN YOUR FERTILIZER YEAR*



IMC Merchandising Calendar, adapted by FARM CHEMICALS.

This second phase of Full Orbit has clearly demonstrated, too, that 156 fertilizer companies with their 350 salesmen stand solidly behind an intensified regional sales meeting program that is aimed at *leaving no stone unturned to give customers a service program right down to the last detail.*

Examples: What kind of door prizes are appropriate—and where they can be obtained . . . baby-sitting services . . . and on and on.

Each of the 30 IMC salesmen has his own "Merchandising Reference Cuide" covering all these specific points. But what's even more impressive is that he can obtain an action kit for use by each of his customers, who just have to ask for it!

The third new feature for Full Orbit—which Cascino described as still in the planning stage—is a direct result of closer customer-IMC ties created by the service campaign.

It calls for a *two-day meeting*, at IMC's headquarters center in Skokie, of representative fertilizer manufacturers with top IMC management and experts in fields related to the fertilizer industry.

"This customer panel meeting," Cascino explained, "grew directly from the manufacturer's appreciation of our efforts to help him solve his problems. Very briefly, it was created to allow a discussion, between customer and supplier, of problems of mutual concern with a view toward arriving at solutions of mutual benefit. We think it may prove to be one of the most beneficial of all Full Orbit features, particularly from a broad industry standpoint." ▲

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effect on crop yields of GRANULATION VS. MECHANICAL MIX and placement of the components of NPK

By G. L. TERMAN, O. H. LONG and J. L. ANTHONY*

SEVERAL INVESTIGATORS have reported that associated fertilizer salts affect the availability to crops of the phosphorus in NPK fertilizers. For example, Fine (1955) summarized experiments conducted in the North Central region of the United States showing that nitrogen, especially, increased utilization of phosphorus in fertilizers. This is of considerable interest in view of the rapid increase in use of granular fertilizers in which N, P, and K are present in intimate association. Most of these granular materials are produced using superphosphates in continuous ammoniation-granulation processes in which various nitrogen solutions are used to supply as much nitrogen to the formulations as is feasible. As a result, most of the water-soluble monocalcium phosphate present in superphosphates is changed during ammoniation to water-soluble ammonium phosphates and AOAC water-insoluble dicalcium phosphate. With ordinary superphosphate, the proportion of the available P_2O_5 that is water-soluble is frequently reduced to about 20 per cent, and even lower under extreme conditions. With concentrated superphosphate, water solubility is seldom reduced below about 50 per cent (Yates, et al., 1954).

Nitric phosphates also contain most of the phosphorus in the form of ammonium and dicalcium phosphates. Highly ammoniated superphosphate-based granular NPK fertilizers and nitric phosphates having low contents of water-soluble phosphorus may also contain considerable amounts of apatite-type phosphates of lower solubility than dicalcium phosphate. It is important to know what effect the various associated fertilizer salts have on plant response to phosphorus in the phosphates of different water solubilities.

The objective of this paper is to report results of experiments designed to study the effects of nitrogen salts and particle size on crop response to phosphates of high (diammonium phosphate and concentrated superphosphate) and of low water solubility (dicalcium phosphate).

Preparation of Fertilizers

A series of NPK fertilizers was prepared by the TVA Development Branch for field experiments. AN (ammonium nitrate, 33.5-0-0) and AS (ammonium sulfate, 20.6-0-0) were used to formulate fertilizers with CSP (concentrated superphosphate, 0-48-0) and DCP (anhydrous dicalcium phosphate, 0-48-0). AS was also formulated with DP (diammonium phosphate, 21-53-0). KCl (muriate of potash, 0-0-60) was used as the source of potash. Fine components (−35 mesh) were granulated and sized to −6+14 mesh granules. For comparable mechanical mixtures, −6+14 granules of CSP and DCP made from fine material and −6+14 mesh granular AN, AS, DP, and KCl were mixed. The various experimental fertilizers are shown in table 1.

For experiments on effect of placement of N, P, and K for crops, −35 mesh AN, CSP, DCP, and KCl were used.

Results in Field Experiments

Eight field experiments comparing granulation and mechanical mixing of the components of NPK fertilizers were conducted during 1956 and 1957 in Georgia, Mississippi, and Tennessee. Of these eight experiments completed, two in Georgia on cotton and two in Mississippi on millet or wheat forage showed no yield response to applied phosphorus, and the data are not reported. Marked yield response was obtained in experiments with millet on Tilden fine sandy loam (*p*H 5.6) and wheat forage on Grenada silt loam (*p*H 6.9) in Mississippi and in two experiments with corn for grain on Mountview silt loam (*p*H 5.0) in Tennessee, as shown in table 1. Acre rates of P_2O_5 were 30 pounds for millet and 20 pounds for wheat applied in the row with the seed, and 40 pounds for corn applied in row side bands. Adequate N (60 or 90 pounds) and K_2O (50 or 60 pounds) were applied to prevent these nutrients from limiting yields. Each fertilizer treatment was replicated four or five times in the experiments. Phosphorus content of millet and wheat forage was determined in two of the experiments in Mississippi. Conclusions based on uptake of phosphorus were the same as for yields of dry forage.

In all four experiments granulation of AN or AS with DCP increased yields of dry forage or corn, as compared to mechanical mixing of the same size granules of each component. The difference in yield was much greater in the case of AS than with AN as the nitrogen source. As an average for the four tests, for example, AN granulated with DCP was only 80 per cent as effective as AN granulated with CSP,

*Agronomists with the TVA Soils and Fertilizer Research Branch, Wilson Dam, Alabama; Tennessee Agricultural Experiment Station, Knoxville; and Mississippi Agricultural Experiment Station, State College; respectively.

AL MIXING
s o NPK fertilizers

while AS granulated with DCP increased its effectiveness to 92 per cent. Granules of DCP were relatively low in availability applied as a mixture with granular AN or AS. Starostka and Hill (1955) also found that AS, and AN to a lesser extent, increased the availability of DCP in greenhouse pot tests with alfalfa.

CSP was of similar availability, whether it was granulated or mixed with AN. In the case of AS with CSP and DP, however, slightly but not statistically significant higher average yields were obtained with mixing of the separate granules than with granulation of the components together. Apparently the availability of phosphorus in the CSP and DP fertilizers, already high in water-soluble phosphorus, was not improved by intimate association with the nitrogen salts. Bouldin and Sample (1958), however, found that both AN and AS increased availability of the phosphorus in pellets of CSP to oat forage grown in greenhouse pots. Several investigators have found a content of water-soluble phosphorus of 40 to 60 per cent of the available P_2O_5 to be important in early growth response and sometimes in final yield response of grain or hay, and only occasionally has further response been found to higher water solubility.

Table 2. Relative yields in field experiments comparing placement of N (AN), P (CSP), and K (KCl) separately and together in bands. All materials were −35 mesh.

Placement of fertilizer[1]		Relative yields[2]				
		Wheat forage			Seed cotton	
Band 1	Band 2	Miss. 1956 (1)	Miss. 1956 (2)	Miss. 1957	Tenn. 1957	Average
PK	N	94	99	104	88	**96**
NK	P	90	102	102	96	**98**
NP	K	94	96	104	90	**96**
NPK	NPK	100	100	100	100	**100**
NK	NK	81	62	66	83	**73**

[1] In bands 6 inches apart; seed planted in furrow between.
[2] Acre yields taken as 100 were 3619, 4487, and 2152 lbs. of dry wheat forage and 840 lbs. seed cotton, respectively.

Applying NPK in Same and Separate Bands

Eight field experiments were conducted in Georgia, Mississippi, and Tennessee to compare application of AN, CSP, and KCl separately and together in bands six inches apart for various crops. Two of these experiments in Georgia and one in Tennessee on cotton and one in Mississippi on wheat for forage did not show yield response to applied phosphorus, and the yields are not reported. Relative yields in the other three experiments with wheat forage on Grenada silt loam (*p*H 7.3) and Tilden fine sandy loam (*p*H 6.1) in Mississippi and one with cotton on Mountview silt loam (*p*H 5.4) in Tennessee are shown in table 2. As an average for the four experiments, there was no appreciable difference in yields among the various placements. The same results were obtained with DCP, which was also included in the Mississippi experiments.

Phosphorus content of cotton leaves in the two Tennessee experiments and of wheat forage in the three Mississippi experiments was determined. Per cent phosphorus averaged lowest for no-phosphorus

Table 1. Relative yields in field experiments comparing granulation and mechanical mixing of the components of NPK fertilizers. Granule size of all materials was −6+14 mesh.

Components[1]	How granulated	Fertilizer grade	Water-soluble P_2O_5, % of avail. P_2O_5	Relative yields[2] Millet, Miss. 1956	Wheat, Miss. 1957	Corn, Tenn. 1956	Corn, Tenn. 1957	Average
AN + CSP + KCl	Together	9-18-18	58	100	100	100	100	**100**
	Separately	9-18-18	86	107	94	97	102	**100**
AS + CSP + KCl	Together	7-14-14	72	95	100	94	100	**97**
	Separately	8-16-16	85	114	100	103	100	**104**
AN + DCP + KCl	Together	9-18-18	1	79	71	74	97	**80**
	Separately	9-18-18	3	76	45	56	92	**67**
AS + DCP + KCl	Together	7-14-14	7	86	94	86	103	**92**
	Separately	8-16-16	4	79	57	65	99	**75**
AS + DP + KCl	Together	11-22-22	100	91	102	93	99	**96**
	Separately	12-24-24	100	88	100	92	103	**96**
No phosphorus	—	—	—	62	35	58	83	**60**

[1] AN—ammonium nitrate; AS—ammonium sulfate; CSP—concentrated superphosphate; DCP—dicalcium phosphate; DP—diammonium phosphate; and KCl—muriate of potash.
[2] Acre yields taken as 100 were 1040 lbs. millet forage, 2668 lbs. wheat forage (oven-dry weights) and 34.7 and 51.4 bu. shelled corn (15.5% moisture), respectively.

(NK), intermediate for NK-P, and highest for PK-N, NP-K, and NPK treatments. Differences were not consistent for the various experiments.

Apparently any possible initial effect of AN placed with CSP on its availability was soon removed by movement of the nitrogen in the soil under influence of moisture. That is, the AN was soon dissolved and probably moved out of the band where placed. Differences in the solubility of the soil-phosphorus reaction products were found by Bouldin and Sample (1958) in laboratory studies, but any differences in the field were not reflected in crop yields.

These results obtained in Mississippi and Tennessee are in sharp contrast to those obtained under drier conditions in Nebraska (Olson, et al., 1956) and similar areas, which show that ammonium nitrogen placed with superphosphate greatly increased efficiency of phosphorus use by oats and wheat. Usually in the experiments where greatest effect of the nitrogen salt has been found, no other fertilizer nitrogen was applied except that in the phosphate band.

Results in Greenhouse Experiments

In a greenhouse experiment with oats grown on two soils at Wilson Dam, Bouldin and Sample (1958) found average relative yields of 128 per cent for both AN and AS incorporated with pellets of CSP, as compared to 100 for pellets of CSP alone. Similar effects were found for incorporations of ammonium chloride and potassium nitrate. Additional nitrogen and potassium were added, so that these nutrients were not limiting for plant growth. The salts reduced the amount of phosphorus remaining at the pellet site and increased the concentration of phosphorus in the soil adjacent to the pellets. This apparently resulted in the higher yields with the incorporations of nitrogen and potassium fertilizer salts.

Starostka and Hill (1955) compared pellets of DCP alone and in mixtures with AN and AS for alfalfa grown in the greenhouse on three soils at Beltsville, Maryland. Average relative yields were 107 per cent with these salts, as compared to 100 for DCP alone. Incorporation with several other salts also increased yields.

CSP and DCP granulated with AN in −6+14 and −35 mesh granules were compared in greenhouse experiments at Wilson Dam. In two experiments (with wheat and millet) the fertilizers were banded in a layer an inch and a half below the surface of the soil in the pots. In the third experiment (with oats) the fertilizers were mixed throughout the soil. Hartsells fine sandy loam was used in experiments 1 and 2, and Mountview silt loam in experiment 3. Results in table 3 show that availability of both granular and fine CSP was high in the two experiments. Granular DCP was very low in availability, while fine DCP was much better but still considerably poorer than CSP.

Results from these experiments showed conclusively that availability of the phosphorus in fine DCP was reduced markedly by granulation. Presence of AN in the granules, while it apparently had some effect on availability, did not make granular DCP a satisfactory fertilizer for the crops for which it was applied. Similar results in other greenhouse and field experiments were reported by Terman, et al. (1956).

Table 3. Relative yields in greenhouse experiments comparing granular and fine CSP and DCP.

Crop and placement of the fertilizer	Mesh size	Relative yields[1] CSP (89% of avail. P_2O_5 water-soluble)	DCP (3% of avail. P_2O_5 water-soluble)	No P
Wheat, experiment 1 (Banded in a layer)	−6+14	100	49	36
	−35	99	86	
Millet, experiment 2 (Banded in a layer)	−6+14	100	17	4
	−35	104	48	
Oats, experiment 3 (Mixed with soil)	−6+14	100	43	29
	−35	92	72	

[1] Pot yields of dry matter taken as 100 were 8.0 gm. of wheat, 18.5 gm. millet, and 11.3 gm. of oats. The plants were harvested in the boot stage after 9, 7, and 5 weeks, respectively.

Summary

Granulation of ammonium nitrate or ammonium sulfate with dicalcium phosphate appreciably increased the availability of the phosphorus to millet, wheat, and corn grown in field experiments in Mississippi and Tennessee, as compared to mechanical mixing of the granular components. Granulation of these nitrogen salts with concentrated superphosphate did not increase yields appreciably, as compared to mixing the granular components. These results show the importance of nitrogen salts in granular fertilizers having a low content of water-soluble phosphorus caused by reversion to dicalcium and more basic phosphates.

The same yields of wheat forage and cotton were obtained in field experiments whether the NPK components were applied in the same or in separate bands 6 inches apart.

Dicalcium phosphate granulated with AN (−6+14 mesh) did not produce satisfactory yields of wheat, millet and oats in greenhouse pot experiments. Fine dicalcium phosphate (−35 mesh) produced much better yields but not as high as granular or fine concentrated superphosphate.

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TECHNICAL REVIEW

Use of UREA in ammonium nitrate—ammonia—water solutions

By H. H. TUCKER*

THE RECENT INNOVATION of adding urea to ammonium nitrate-ammonia-water solutions is one of the most interesting technological advances in fertilizer manufacture. Urea is added for its effect on:

1. Physical properties of the solution and
2. Manufacturing and conditioning of the end product.

Effect on Physical Properties of Nitrogen Solutions

Addition of urea to ammonium nitrate and ammonia in nitrogen solutions has been shown to reduce the saturation or salting out temperature of the solution. This makes possible the use of higher ratios of salts to ammonia, or an increase in what is termed the *fixed to free nitrogen ratio.* Reducing the saturation temperature may, therefore, permit a reduction in the amount of water.

Increase in fixed to free nitrogen ratio—or reduction of ammonia—reduces the vapor pressure of the solution. The reduction of ammonia reduces the nitrogen content of the solution, since an 82 per cent nitrogen material is being replaced by salts which contain 35 or 46 per cent nitrogen. Interaction of all these factors must be considered.

Effect on Fertilizer Formulation

Work has shown that addition of urea to fertilizer mixes containing ammonium nitrate and potassium chloride will increase the plasticity of the material and improve granulation. This increased plasticity is due to the increased solubilities of combinations of urea and ammonium nitrate or ammonium chloride. To prevent excessive plasticity, the amount of urea which can be added to ammonium nitrate containing fertilizers is limited. At 86°F., 100 grams of water will dissolve 242 grams of ammonium nitrate or 133 grams of urea. At the eutectic point of 46 parts urea to 54 parts ammonium nitrate, 100 grams of water will dissolve 1564 grams of combined salts at 86°F. The 242 grams of ammonium nitrate in 100 grams of water will increase the solution volume from 100 to 251. 133 grams of urea in 100 grams of water will increase the solution volume from 100 to 201. The 1564 grams of combined urea-ammonium nitrate at the 46-54 ratio will increase the solution volume from 100 to 1206. This would mean that these salts could be proportioned to increase the volume of one pint of water from 2 to over 12 pints of solution even at 86°F. At higher temperatures the solubilities would be even greater.

The solubility of combinations of urea or ammonium nitrate in water increases gradually with first additions of the second salt. This solubility increases very rapidly as the eutectic combination is approached. For these reasons dry fertilizers containing urea and ammonium nitrate near eutectic proportions may become soggy or plastic at relatively low moisture contents—particularly so at high temperatures.

Properly formulated, the combination of urea and ammonium nitrate can be beneficial in contributing to plasticity at high temperatures for desired granulation and in giving good hard granules when the excess heat is removed. Wide ratios of urea to ammonium nitrate are necessary in order to prevent sogginess or tackiness of the dry end product.

Effect on Fertilizer Conditioning

Addition of urea to fertilizer mixes containing ammonium nitrate and potassium chloride will change the crystal structure of the resultant ammonium chloride from a fern-shaped or dendritic crystal to a cube crystal. This change in shape of crystal formation has definitely been shown to reduce caking or setting of resultant fertilizers. Hygroscopic properties as well as solubilities of combinations of urea and ammonium nitrate or ammonium chloride limit the amount of urea which can be used.

Limits which have been found to be satisfactory, in that there is sufficient urea to alter the crystal structure of ammonium chloride and still not be soggy, are 20 to 50 pounds of urea per ton of end product made with ammonium nitrate solutions. Limits of 30 to 45 pounds have been found to be even better. Fertilizers containing soluble salts such as ammonium nitrate and/or urea should be dried below 2 per cent moisture.

To obtain the desired amount of 30 to 45 pounds of urea per ton of end product the quantity of urea in an ammonium nitrate solution is adjusted to the amount of solution to be used. This amount of nitrogen solution is determined by the amount of nitrogen to be obtained from solution and the nitrogen content of the solution. When not over 300 pounds of solution is being used a 15 per cent urea content is acceptable. Where 700–750 pounds of solution are used the urea content of ammonium nitrate solutions is limited to a maximum of 6 per cent.

Selecting a Solution

It is usually desirable, economically, to obtain the highest amount of nitrogen possible from solutions. With high nitrogen grades large amounts of nitrogen solutions may be used. The high fixed-to-free ratio of nitrogen in fertilizer solutions for high nitrogen mixed fertilizers is desirable, in order to curtail the amount of acid needed to neutralize excess free ammonia. There would be one ideal solution, therefore, for each grade of fertilizer made under each set of conditions. However, it is usually desirable to compromise on one or two solutions which best fit the range of manufacturing conditions for a given plant and area. Choice of a low fixed-to-free nitrogen ratio solution, along with a high fixed-to-free nitrogen ratio solution, gives versatility of plant operating conditions with low raw materials costs. ▲

Director of agricultural and technical services, Sohio Chemical Co. Adapted for FARM CHEMICALS by the author.

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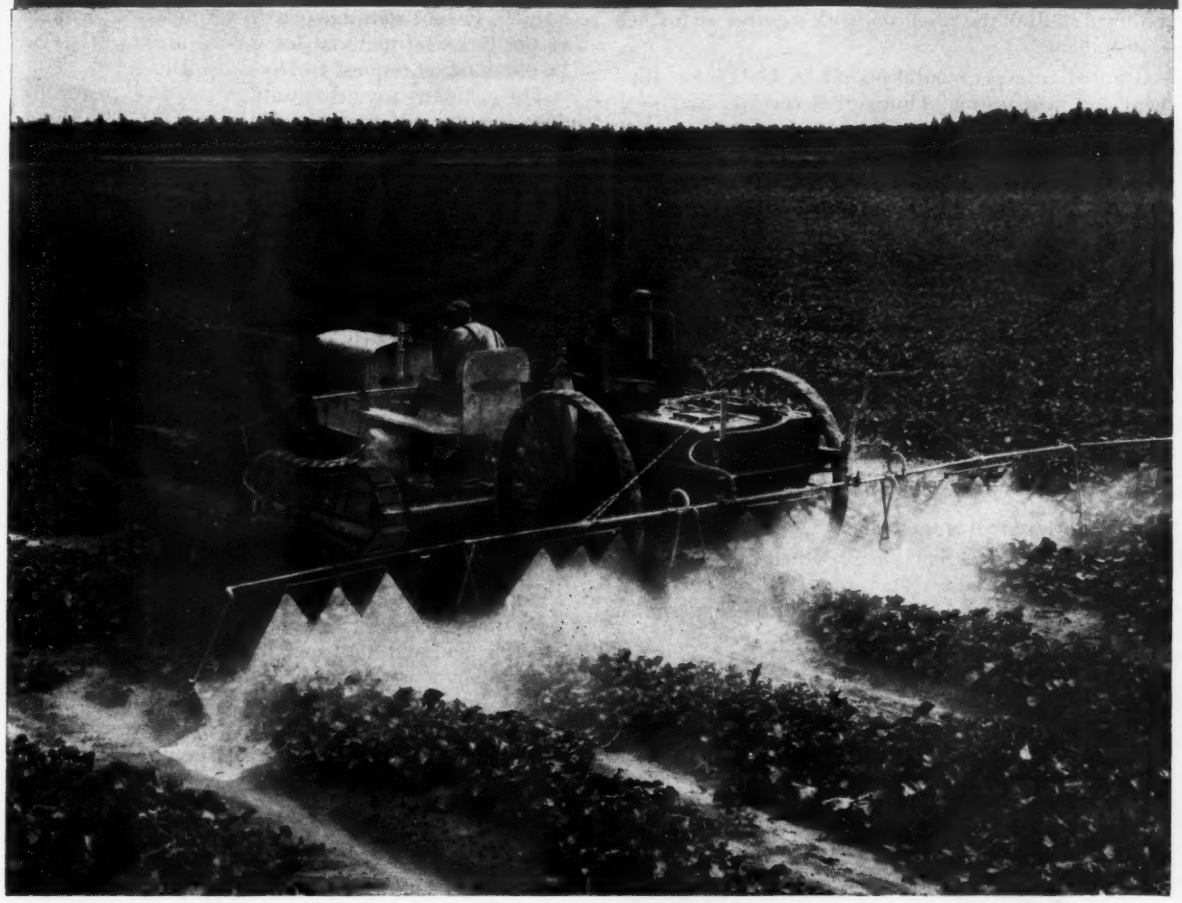

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A Special Report

New Farm Chemicals

Experimental and commercial compounds for plant growth, pest control

Not a chemical, but new

Thuricide (see Washington Viewpont, page 8), will be marketed by Stauffer Chemical Co. The producer, Bioferm Corp., has also arranged with Stauffer to have technical staffs of the two firms work together on further development.

Granted an experimental permit by USDA for shipment and field testing, Thuricide is the first microbial agent to be produced on a large scale for protection of food and forage crops. It is most effective against larvae that chew on plants and can be applied as a dust or spray. It is reported that if the alfalfa caterpillar eats enough treated leaf to ingest 40,000 to 80,000 live spores of the bacteria, it is overcome by the bacterial infection and dies.

Bacillus Thuringiensis was first isolated by Berliner in 1911 but its pest control potential was fully realized only recently when Professor Edward A. Steinhaus of the University of California published a paper on field test results. The spores are reported to retain their potency when mixed with various diluents and insecticides.

DAC Experimental Herbicide

DAC-893, an experimental pre-emergence herbicide resulting from cooperative research of Diamond Alkali Co. and Boyce Thompson Institute, has shown "unique selective action and high activity."

In small-plot field tests at Yonkers, N. Y., and Painesville, O., DAC-893 controlled annual grasses and many of the major broadleaf weeds on which it was tested. In turf and annual crops, good weed control was obtained for the entire season. Results indicate that DAC-893 merits further investigation as a selective pre-emergence herbicide, Diamond Alkali reports.

DAC-893 will be available to qualified investigators as a 50 per cent wettable powder formulation. Samples of the technical material for special investigation can be obtained on request to Diamond Alkali.

The company says that until adequate experimental data is obtained, crops treated with DAC-893 should not be used for food or forage.

Dr. H. M. Reisenauer, soil scientist at Washington State College, compares molybdenum-treated peas (right) with untreated peas. Climax Molybdenum Co. is now producing **Moly-Gro,** which contains molybdenum, an adhesive and a sequestering agent. Used for seed treatment, it aids in nitrogen fixation by legumes and is compatible with inoculants. It will be marketed through Motomco, Inc., beginning in Georgia, Wisconsin, Oregon, Washington and Idaho—states that have reported crop response to molybdenum.

S-847 Experimental Herbicide

Called S-847, a compound identified several years ago in Spencer Chemical Co. research shows promise as a selective herbicide for wild oats.

Spencer reports that while research with this herbicide has been promising, it is still in the experimental stage. Currently S-847 is available only for further research and testing as a selective herbicide to state, provincial or federal herbicide specialists in the U. S. and Canada.

Ozoban—Spray For Smog

Ozoban, a spray reported to be effective in reducing crop losses from smog, is now commercially available. Produced by Chas. Pfizer & Co., Inc., it is being tested at the California Agricultural Experiment Station at Riverside, where it has been found to be effective in trials on vegetable crops and flowers. A mixture of ascorbic acid and inert ingredients, it yields a solution of potassium ascorbate when dissolved in water. It is now known that smog damages at least 26 plants. Ozoban enters plant cells, imparting a resistance to toxic effects of ozone and oxidized hydrocarbons. To date, it has shown no deleterious effects on plant tissues.

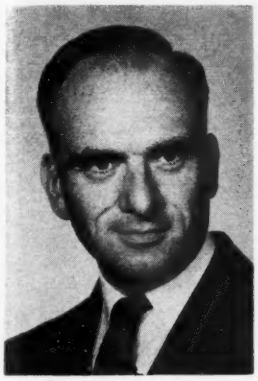
Some New Fungicides

At the joint meeting of the Commercial Chemical Development Association and the National Agricultural Chemicals Association, Nov. 20, Dr. Ely M. Swisher, Rohm & Haas Co., commented on "several interesting new fungicides" that have been offered for development, mentioned these:

▶ Dyrene, formerly known as Kemate or B-622, is produced by Chemagro Corp. and was developed by the Ethyl Corp. and Pittsburgh Coke & Chemical Co. Chemically, Dyrene is 2,4-dichloro-6-(0-chloroanilino) triazine. It is sold as a 50 per cent wettable powder which may be sprayed or compounded into a dust. It is particularly effective against Stemphylium on tomatoes, early blight on potatoes and tomatoes, and celery blights. It will compete with the carbamate and copper fungicides for this use. Dr. Swisher said that Dyrene, "fair to poor against late blight of potatoes

nd tomatoes," appears to be "reasonably effective against apple scab but is somewhat phytotoxic."

▶ Maneb, the common name applied to manganese ethylene bisdithiocarbamate, is marketed by Du Pont under the trade name Manzate and by Rohm & Haas under the trade name Dithane M-22. "While not a brand new development," Dr. Swisher said, "new important uses for Maneb are developing that will likely have an important impact on the fungicide market." Maneb has "virtually replaced" zineb and copper as the top recommendation for tomato disease control, he said, adding that it is advancing as a potato fungicide—"and is expected to replace" zineb as the major potato fungicide. Maneb currently has "limited use" on fruits, he said.



Dr. Ely M. Swisher

▶ Thioneb, not yet cleared for commercial use, is a foliar fungicide showing "considerable promise" for fruit and vegetable use, Dr. Swisher said. Chemically it is polyethylene thiuram sulfide. It is offered as a 50 per cent wettable powder by Naugatuck Chemical Division, U. S. Rubber Co.

▶ Karathane, Dr. Swisher reported, "is an example of a new fungicide that has protective properties plus some eradicating properties when applied as a foliar spray." Originally developed as a miticide, it is "highly specific" for control of powdery mildew fungi, for which application it completes with sulfur. Chemically it is dinitro (1-methyl heptyl) phenyl crotonate. The 25 per cent wettable powder and dust base is marketed by Rohm & Haas Co.

Dibrom Experimental Insecticide

Dibrom (formerly RE 4355) insecticide, produced by California Spray-Chemical Corp., and offered in limited quantities for this season, has been effective in tests as a contact and stomach insecticide. Chemically, it is 0,0-dimethyl-0-(1,2-dibromo-2,2-dichloroethyl) phosphate. Residual activity is reported to be relatively short. Optimum effective dosages are not yet established. An emulsifiable concentrate is available.

Delnav Miticide-Insecticide

Produced by the Hercules Powder Co., Delnav is registered for use on food crops on a no-residue basis. Chemically, it is 2,3-p-dioxanedithiol-S,S-bis (0,0-diethyl phosphorodithioate). It has been granted label approval for control of mites on cotton, citrus, dried beans, seed alfalfa and other crops, and has given effective control of several species of mites and insects. It is available as a 47 per cent emulsion concentrate.

Cyprex For Growers in 1959

American Cyanamid Co. reports that Cyprex (dodecylguanidine acetate) will be available to growers in major fruit areas in 1959. Cyprex has been most extensively tested against apple scab. It protects fruit and foliage against the disease. When applied after an infection period, it eradicates scab that may become established. Present government clearance is for control of apple scab through first cover sprays. The fungicide underwent three years of field testing, and in December two years of chronic toxicity studies were completed. The company will petition for a tolerance permitting later apple cover sprays and full season use on cherries and pears.

New Plant Regulators

John W. Mitchell, director of the USDA Growth Regulator and Antibiotic Laboratory, said recently that an "attempt is being made to find new plant regulating chemicals, especially those that cause plants to grow as dwarfs, and those that control the metabolism of plants."

Referring to chemicals now undergoing tests at the Beltsville Research Center, he reported that 2,5-dichlorophenoxyacetamide "may be useful" in preventing pre-harvest drop of McIntosh and York apples —without hastening rate of ripening.

Storage quality of potatoes has been improved by 3-chloroisopropyl N-phenylcarbamate, he said. Animal toxicity tests on this compound are now being made.

Growth of some kinds of plants can be suppressed in a "remarkable way" with AMO-1618, he said. This compound, 4-hydroxy-5-isopropyl-2-methylphenyltrimethyl ammonium chloride-1-piperidine carboxylate, causes some species of plants to grow as dwarfs without otherwise changing their appearance. Effective when applied to the soil, it persists in the soil "for prolonged periods," he said.

Repellents and Attractants

S. A. Hall, director of the USDA Pesticide Chemicals Research Laboratories, reporting recently on research in the field of insect repellents, said that work now in the early preliminary stages is uncovering a series of chemicals that will repel mosquitoes at a distance of a few inches. "We are not yet ready to select a chemical from this series for more exhaustive studies," he said.

Dr. Hall said that recent research on insect attractants has shown that *cis-trans* isomerism is significant in the chemical *siglure* (*sec*-butyl 6-methyl-3-cyclohexene-1-carboxylate) the synthetic attractant for the Mediterranean fruit fly. The *trans* isomer is "appreciably more attractant" to the Medfly than the *cis* isomer, he said.

Chemical studies on the gypsy moth sex attractant are progressing, he said, explaining that testing of synthetic compounds based upon "fragmentary knowledge" of the natural sex attractant's structure "is beginning to pay dividends." Last summer, he reported, a test method was developed that will measure the attractiveness of candidate materials to the male gypsy moth. This work is being aided by Forest Service researchers at New Haven, Conn., who have developed a technique for artificially rearing the gypsy moth. ▲

More chemical reports in your February FC

MATERIALS HANDLING
CUSTOM APPLICATION

bag filling machines

As a service to readers, FC asked suppliers of bag filling machines to tell us about their latest models. If a supplier furnished the requested information, a report based on it is here. You can obtain details by using the Reader Service card attached to page 39.

UNION'S I & C BAGGER

More than twenty 50 or 100 pound bags a minute can be weighed and filled automatically by Union's I&C Bagger, Union Bag-Camp Paper Corp. reports. It handles open mouth bags of from 10 to 200 pounds. Union Bag-Camp is exclusive sales agent for the bagger, made by Inglett & Company, Inc.

Model UB-101 has a weighing accuracy of two ounces or less, depending upon variations in densities and flow of materials.

Floor space required for this model is 5′ x 5′ and head room needed is 9′2″ above the sewing conveyor.

In addition to the UB-101, several other models are available.

For more information on Union I&C Baggers,

CIRCLE 35 ON SERVICE CARD

SOUTHLAND PACKER

Chase Bag Co. reports that the Southland Packer automatically fills and weighs open mouth textile or multiwall paper bags. Distributed exclusively by Chase, the Southland is manufactured by Chattanooga Boiler and Tank Co.

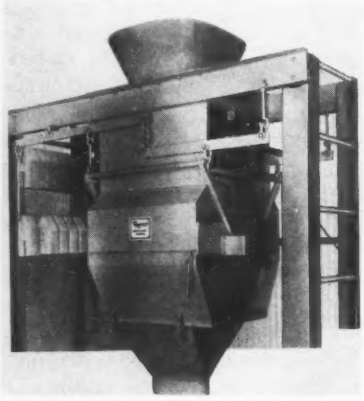
The packer fills 50, 80 and 100 pound multiwall paper bags, with 25 bags a minute typical working speed. Burlap bags weighing 200 pounds can be handled with the all-electric machine.

Twelve gauge or heavier steel plate is used in construction of the packer. The feeder, which operates continuously, uses a ½ hp gear-enclosed motor to operate its belt.

For details on the Southland,

CIRCLE 36 ON SERVICE CARD

RAYMOND ROTOMATIC



Model A Raymond Rotomatic Packer

The Model A Raymond Rotomatic Packer, manufactured by Raymond Bag Co., is an automatic open mouth machine. It weighs and packs free flowing materials in standard 50 to 100 pound multiwall bags. Under ideal conditions, the machine is capable of cycling at the rate of forty-five 100 pound units per minute. Bagging rate varies with rate of feeding bags to the filling tube.

The Rotomatic operates by gravity. Material being packed activates all mechanical and weighing components. It is made of heavy gauge high-carbon steel. Headroom of 9′3″ is required from top of the conveyor to bottom of the supply bin for standard floor mounted installation.

For complete information,

CIRCLE 37 ON SERVICE CARD

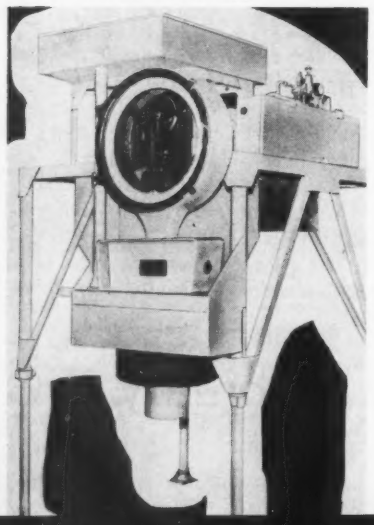
KRAFTPACKER

Sales agent for the Kraftpacker automatic open mouth bag filling machine for free-flowing material, Kraft Bag Corp., reports that the latest model accommodates weights from 25 to 200 pounds.

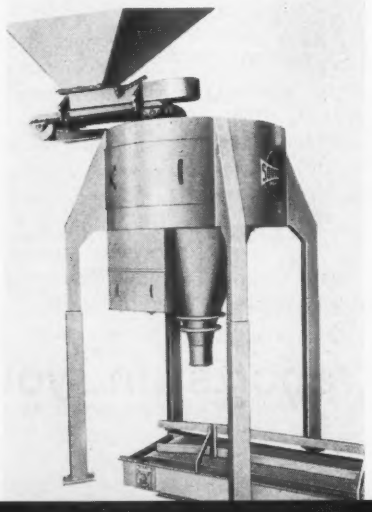
In operation, the Kraftpacker preweighs material to within 4 oz. with speeds of up to 24 charges a minute. A flow-gate quadrant on the conveyor can be lowered or

(*Please turn to page 47*)

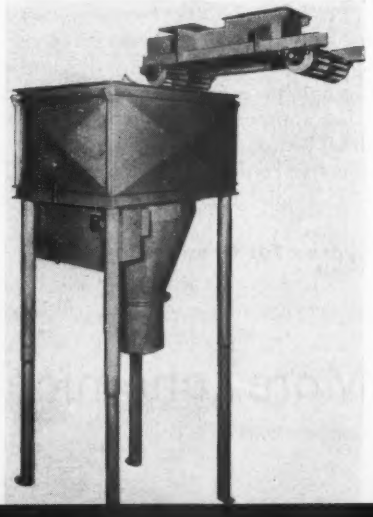
Union's I&C Bagger



Model B Southland Packer



Kraftpacker



READER SERVICE

FREE INFORMATION to help you solve fertilizer, pesticide problems

Chemicals

1—EDUCATIONAL PROGRAMS FOR HEPTACHLOR

Copies of all materials included in the Heptachlor educational program are available from Velsicol Chemical Corp. Among the materials are a heptachlor insect control forum, a newsletter and insect control guide sheets. Your name will be placed on their mailing list if you

CIRCLE 1 ON SERVICE CARD

2—DEHYDROACETIC ACID AS FUNGICIDE

Aceto Chemical Co., Inc. says that dehydroacetic acid has been shown to inhibit the growth and propagation of a wide range of bacteria and fungi. It has been used in the treatment of strawberries, Aceto reports. More information is available by

CIRCLING 2 ON SERVICE CARD

3—BARDEN CLAY

Lowest abrasion, greater uniformity and better sticking are among the advantages J. M. Huber Corp. claims for Barden Clay. It can be used as a carrier-diluent in wettables and dusts, as an anti-caking conditioner in prilled fertilizers and 93–94 per cent sulfur. Technical data is available by

CIRCLING 3 ON SERVICE CARD

4—RODENTICIDE CONCENTRATE SAMPLE

A free sample of its water soluble anticoagulant rodenticide is being offered to formulators by Inland Chemical Corp. The sample is in a 1⅛ ounce hermetically sealed container. To obtain the sample, formulators only may

CIRCLE 4 ON SERVICE CARD

5—GIBREL BOOKLET

"What You Can Tell Farmers About Gibrel," prepared by Merck & Co., Inc., is now available. The semi-technical publication contains information on the practical commercial use of Gibrel, the company's trademark for its brand of gibberellin plant growth substance. The booklet explains what Gibrel is, how it works, its practical uses and formulations. For your free copy,

CIRCLE 5 ON SERVICE CARD

6—GUIDE TO DIAMOND PESTICIDES

"Your Ready-Reference Guide to Dependable Diamond Weed and Brush Killers for Effective, Easy, Economical Weed and Brush Control" is the title of an illustrated, 12-page booklet issued by Diamond Alkali Co. Briefly reviewed in this pocket-size catalog are the Crop Rider, Fence Rider and Line Rider groups of Diamond herbicide formulations. Copies are available by

CIRCLING 6 ON SERVICE CARD

Process Equipment

7—TEMPERATURE CONTROL VALVES

A bulletin from OPW-Jordan gives full information on the new lead coated sensing bulb and thermal system now available with all the company's sliding gate temperature control valves. The valves are said to have corrosion resistance to a broad variety of chemicals and are suitable for temperatures up to 400°F. To secure your copy of the literature,

CIRCLE 7 ON SERVICE CARD

8—I & C ROTARY PULVERIZER

A rotary pulverizer has been added to the Inglett & Company line of fertilizer industry equipment. Available in both chain flail and sling bar types, it is claimed to be fast, effective and rugged. The manufacturer will send you details, if you

CIRCLE 8 ON SERVICE CARD

9—ELECTRICONTACT METERS

Information on Niagara Meters for use in liquid fertilizer formulation is available from the Buffalo Meter Co. The Electricontact meter measures volumetrically, the manufacturer says. Set it to the desired gallonage and it automatically stops the flow when that gallonage has been delivered. For more information,

CIRCLE 9 ON SERVICE CARD

10—JOY COMPRESSORS

A new eight page bulletin covering Joy Manufacturing Co.'s complete line of heavy duty, low pressure compressors has just been published. It includes specifications on three models ranging from 756 to 7392 C.F.M. and a detailed sectional drawing. The company describes its low pressure air compressors as "single-stage double-acting, water-cooled compressors of V-vertical and semi-radial design." For your copy of the illustrated bulletin,

CIRCLE 10 ON SERVICE CARD

11—DRIVES & COUPLINGS

Dodge Corp. has issued a 24-page bulletin on its expanded line of Flexidyne Dry Fluid Drives and Couplings. Product photographs, engineering drawings and installation pictures are included. There are 10 stock couplings and eight stock drives ranging from fractional to 1,000 hp. The bulletin has tables to facilitate selection for normal and heavy-duty service. To get a copy,

CIRCLE 11 ON SERVICE CARD

12—GRAVER CHEMICAL PROCESS BULLETIN

Chemical processing is the subject of a six-page color bulletin from Graver Water Conditioning Co. It details the equipment and services available from Graver in this field. Processes and equipment for ion exchange, sedimentation, filtration and flotation are described. What the latest methods of chemical processing can mean to industry is discussed in one section of the bulletin. A copy will be yours if you

CIRCLE 12 ON SERVICE CARD

13—ADJUSTABLE PUMP OPERATION

New literature released by Allis-Chalmers contains operating data on the ACAP pump for handling liquids or hygroscopic solids in suspension under variable capacity and head requirements. Designed for all types of industry, the pump's flow control is handled by a manually or automatically operated adjustable internal bypass mechanism. This, the manufacturer says, eliminates the need for a valve controlled discharge where solids can build up an obstruction. To obtain your copy of the 8 page illustrated bulletin,

CIRCLE 13 ON SERVICE CARD

14—ELECTRIC EAR

A four page folder from Hardinge Co., Inc. describes its Electric Ear sound control. Type DA is said to be especially suited to automatic control of ball, pebble, rod and autogenous grinding mills. A sound recording chart is included in the Type DAR Electric Ear. The charts can be dated and filed as a continuous record of grinding mill operation, Hardinge reports. For your copy,

CIRCLE 14 ON SERVICE CARD

15—MUNSON MILLS

Munson hammer mills will reduce almost any friable material into a fine

how to use the READER SERVICE CARD

- *Circle number of literature you want*
- *Print or type your name, position, company and address*
- *Clip and mail the Service Card*

product, according to Munson Mill Machinery Co. If raw material consists of large pieces, a pre-crusher may be used for initial reduction and uniform feed into the mill. For general grinding, standard equipment consists of both heavy and light hammers. Number and arrangement of hammers can be varied. Both weights of hammers have "step ends" and may be reversed so that all four edges can be used. For further information

CIRCLE 15 ON SERVICE CARD

16—COMPLEX FERTILIZER

Title of a new brochure from The Chemical and Industrial Corp. is "Complex Fertilizer." It describes the Spherodizer Process, a system for pelletizing slurries. The process differs from other pelletizing methods, C&I says, in that pellet formation and drying are carried out continuously by spraying the slurry into a falling curtain of material in a rotating drum in a hot stream of air and combustion gases. A flow sheet is included. For your copy,

CIRCLE 16 ON SERVICE CARD

17—GRANULAR FERTILIZER EQUIPMENT BULLETIN

A free bulletin, "Renneburg Continuous Granular Fertilizer Equipment," has been prepared by Edw. Renneburg & Sons Co. The company manufactures ammoniators, coolers, dryers, elevators, granulators and conveyors for the plant food industry. The Renneburg continuous combination ammoniator-granulator is said to save money, save time, offer flexibility and higher rate of ammoniation. For your copy of the bulletin

CIRCLE 17 ON SERVICE CARD

Materials Handling

18—Y & T LIFT TRUCK

A 5000 pound capacity model has been added to Yale & Towne Mfg. Co.'s K51W line of sit-down, rider type electric lift trucks. The truck is 73¾ inches from rear of counterweight to face of forks and can right angle stack comfortably in an aisle measuring 10 feet, 4 inches in width, according to Y&T. It is reported to have the same speeds of travel and lift as lower capacity trucks. For details on the new model,

CIRCLE 18 ON SERVICE CARD

19—PALLET HANDBOOK

"Pallet Handling in Narrow Aisles," published by The Raymond Corp., describes its trucks for narrow aisle operations and shows on-the-job pictures of the equipment in use. The 24-page booklet includes specifications and cutaway drawings. For your free copy,

CIRCLE 19 ON SERVICE CARD

20—CYLINDRI-PAK PALLET BOX

General Box Co. says its cylindrical wirebound pallet box, the Cylindri-Pak, can be used for granular, free flowing materials and other items which lend themselves to bulk handling and shipping. Sides are of thin wood bound with galvanized steel wires. The plywood base is mounted on hardwood skids, equipped with a steel channel rim. Standard outside diameters are 36" and 42½"; inside heights range from 30" to 72". Details are available by

CIRCLING 20 ON SERVICE CARD

21—LEASING PLANS DESCRIBED

Methods of leasing materials handling equipment are described in a new 4-page, 2-color circular available from Lewis-Shepard Products, Inc. Three plans are covered: lease option, straight or true leases and "power package" leases. Free copies are available simply by

CIRCLING 21 ON SERVICE CARD

See pages 61, 64 and 65 for information on these Reader Service numbers:

30—Lion E-2
31—H-90 Payloader
32—Drying Oven
33—J-M Verticone
34—Munson Shovel

And for a roundup of the latest bag filling equipment, see pages 32 and 47. Numbers are provided on the card for further information.

Miscellaneous

22—AUTOANALYZER FOR CHEMICAL ANALYSIS

The Technicon AutoAnalyzer is a new system for continuous automatic chemical analysis that can detect trace materials down to parts per million with an accuracy of one per cent, reports Technicon Controls. In the laboratory, the analyzer runs 20, 40 or 60 tests per hour without human supervision, and in the plant, it can be hooked up to the process or waste stream, liquid or gas, says Technicon. For further information,

CIRCLE 22 ON SERVICE CARD

23—FERTILIZER PUMPS

Pumps for fertilizer and for temperature controlled liquids are covered in a new bulletin from Dean Hill Pump Co. In tests, the fertilizer pump has been running 18 months without shutdown in ammonia fertilizer applications, Dean Hill says. The pump for temperature controlled liquids, such as sulfur, incorporates a steam-jacketed line shaft and discharge column for continuous free flow. The free bulletin is available by

CIRCLING 23 ON SERVICE CARD

24—TECHNIQUES FOR pH MEASUREMENTS

Techniques for making accurate *p*H measurements in usually troublesome samples such as soils, emulsions, suspensions and oils are covered in a new data sheet issued by the applications laboratories of Beckman/Scientific and Process Instruments Div. Proper care of *p*H electrodes is discussed and three separate procedures are outlined. Free copies are available. Just

CIRCLE 24 ON SERVICE CARD

25—BETE NOZZLES

A new series of high capacity nozzles called the Bete "K" series, give finer break-up and are non-clogging, according to the manufacturer, Bete Fog Nozzle, Inc. The nozzles employ three separate orifices from each of which a jet impinges on a deflector plate. Here the jets are broken up and intermingled to form a full-cone spray. Made in seven standard models from 1½" to 8" pipe size, the series covers a flow rate range of 20 to 3000 gpm. For a data sheet,

CIRCLE 25 ON SERVICE CARD

26—CARGO CARRIER

Continental Can Co. says its new corrugated shipping container for bulk materials is particularly suited to use by the chemical industry. Called the Cargo Carrier, it features an inner corrugated tube with bellows corners at major stress points. The corners lock when the bellows scores are broken, creating two separate container compartments. Further details can be had by

CIRCLING 26 ON SERVICE CARD

27—INSTRUMENT CATALOG

A 52-page catalog on process instruments available for quick shipment has been released by Fischer & Porter Co. It covers indicators, transmitters, recorders and controllers for flow, pressure, temperature, density, viscosity and consistency. To obtain your free catalog,

CIRCLE 27 ON SERVICE CARD

28—FIBERGLASS TANKS

Hanson Equipment Co. reports it can provide you with Fiberglass tanks to meet your specifications in sizes from 50 to 5000 gallons and any shape required. Literature from the company describes its tanks and includes a chart showing their corrosion resistance to more than 150 chemicals. To obtain a copy,

CIRCLE 28 ON SERVICE CARD

29—SPREADER-SEEDER

A four-page bulletin from E. S. Gandrud Co., Inc. pictures and describes the Gandy Spred • N • Fold spreader-seeder. While it covers a 20 foot swath in the field, the unit folds to 7 ft., 7 in. overall width in seconds, Gandrud reports. The bulletin pictures attachments available for the spreader-seeder and gives its special features. For your copy,

CIRCLE 29 ON SERVICE CARD

Monsanto introduces the first truly non-caking ammonium nitrate fertilizer LION E-2

Now, for the first time since the development of solid prilled ammonium nitrate fertilizer, you and dealers everywhere may offer customers an ammonium nitrate that ends complaints and costly returns due to caking. It's Monsanto's new LION E-2 ammonium nitrate.

Developed and tested under all extremes of storage conditions by Monsanto farm researchers, amazing LION E-2 surpassed all expectations for non-caking, non-powdering performance. There is nothing like it on the market for dependable, trouble-free storage. It means easier handling for both the dealer and the farmer.

New LION E-2 ammonium nitrate is available this month. It is an exclusive, premium quality ammonium nitrate fertilizer, yet LION E-2 will cost no more than ordinary ammonium nitrate fertilizers.

This combination of premium product performance at ordinary ammonium nitrate prices will make LION E-2 the most wanted ammonium nitrate in America. LION E-2 provides the same sales advantage as offering a high octane, additive-packed gasoline for the price of "regular."

For more information contact Monsanto at once. Write, wire or call:

MONSANTO CHEMICAL COMPANY • Inorganic Chemicals Division • St. Louis 24, Missouri

MATERIALS HANDLING
CUSTOM APPLICATION

Aviation trades group m

Ag flyers load up on la

PEOPLE FLY AIRPLANES for a variety of reasons—for defense, transportation, even sometimes for fun. Some people don't fly airplanes at all but are vitally interested in the kinds of things that planes need.

On the other hand, a lot of people wouldn't be caught dead in a plane, have no interest in them *per se*, but, with their feet planted firmly on the ground, employ planes for one purpose or another.

All three groups were present November 11 to 14 at the annual meeting of the National Aviation Trades Association. Not only were workhorse pilots by the dozen on hand, but there were sellers of radios, gasoline, safety belts, spark plugs, insurance, and beer (the convention was held in Milwaukee). Then there were teachers and scientists and military personnel and ladies and a whole squadron of USDA people. Total: about 350.

While agricultural applicators represent only a portion of the total NATA membership, a sizable chunk of the four-day conference was devoted to matters pertaining to dusting, spraying, seeding, fertilizing, and other operations once attributed to the earth-bound alone. No matter what was discussed, however, nobody strayed very far from the business of safety—Topic A-1 in all aviation meetings.

HAZARDS OF AERIAL APPLICATING

For instance, the deadly serious nature of agricultural flying was brought out when Oscar Bakke, head of the Civil Aeronautics Board's Bureau of Safety, presented the latest figures on agricultural aircraft crashes, fatalities, and injuries. Out of 5100 aircraft being flown by 4100 pilots in 865,800 hours in the United States during 1957, there were 370 accidents. Forty-three of these were fatal. There were no fatalities nor serious injuries in helicopter accidents in a total of 7600 hours of flying. Most accidents occurred in the 35 to 40 age group, and Texas, California, and Arkansas (in that order) led all other states in numbers of agricultural aircraft accidents. *In only five cases reported, accidents were caused by the pilots' being overcome by the chemicals he was spraying.*

That dispersal of pesticides by aircraft may be the *least* desirable method of application was brought out by E. D. Burgess, director of USDA's Plant Pest Control Division. Mr. Burgess pointed to the fact that public opinion in many of the federal insect control projects has been against the use of airplanes. Overdosing, underdosing, and spotty distribution are complaints frequently heard by USDA. "*Any substantial increase in public opposition may have the effect of putting our operation back on the ground. . . It is urgent that we mutually insist on quality workmanship . . . We are convinced that the future of aerial application depends largely on convincing the public of the value of this tool,*" Mr. Burgess stated. The administrator gave as examples of public opposition

Some leaders in NATA activities: Charles A. Parker, executive director for nine years; Robert E. Monroe, Parker's assistant; Al Gossett, AC Spark Plug Division, General Motors Corp.; Joe Rhodes, Atlantic Aviation Corp.; William J. Lotzer, Gran-Aire, Inc., outgoing NATA president; A. Biederman, A. Biederman, Inc., new NATA president.

up meets

on latest flight information

By PETER C. CROLIUS

the airplane control methods employed in the fire ant and gypsy moth eradication programs. He added that there is "a tremendous interest towards biological approaches to pest suppression and towards the development of materials which leave no residues."

MORE ECONOMIC STUDIES NEEDED

Commenting on the need for more extensive and intensive economic studies, Orlin J. Scoville, USDA economist, noted that there have been only two significant studies made of aerial application costs. Others are in the mill, he said, but the needs are many for specific information on *charges and costs, quality and timeliness, and air-ground effectiveness studies.* Dr. Scoville urged aerial applicators to make their research needs known.

Mixed fertilizer is the most corrosive material to unprotected aluminum and steel airplane parts. Unpainted surfaces were badly corroded by 8-8-8 fertilizer in experiments run by the Development Center of Piper Aircraft Corp., reported Fred E. Weick, director of the center. In some cases, surfaces disintegrated to a point where aluminum was useless as a structural material for aircraft. Mr. Weick indicated that of all protective finishes studied by Piper, *epoxy base finishes* gave the best protection to steel and aluminum surfaces.

"*Putting the right amount of pesticide in the right place at the right time . . . safely*"—that's what the government is looking for, said John M. Whiteside of the U. S. Forest Service. "*A successful, accident-free job is good business for both of us,*" he told applicators, in noting the job done by private contractors in the government's forest insect control programs. Mr. Whiteside said that in taking further measures against the spruce budworm and other forest pests, the USDA plans to treat 1,138,000 acres during 1959.

SELECTING CONIFERS WITH HERBICIDES

Airplane application of herbicides to Lake States' forests has proven so successful for the release of young conifers that 6000 to 8000 acres a year are now being sprayed. Ira C. Funk, reporting on work carried out by John L. Arend of the Forest Service, said that low volatile ester 2,4,5-T will kill most hardwood species and will cause little or no damage to conifers. He added that amine 2,4-D and 2,4,5-T produced good results when applied from ground sprayers but that airplane-sprayed amine materials did not make a good showing. The low volatile ester spray is applied after the hardwoods have fully leafed out and the new growth of conifers has started to harden off (about six weeks after hardwoods have leafed out). *Cost of spraying herbicides for coniferous release runs about $5 an acre in the Lake States.*

NATA conventioneers also heard papers on solvents for pesticides for helicopter use, military developments in spraying apparatus, dust swath research, ram-air distributors, and measurements of spray deposits. In sessions other than those devoted to agricultural matters, maintenance, training, radio and telephone, and legislative and restrictive subjects were discussed.

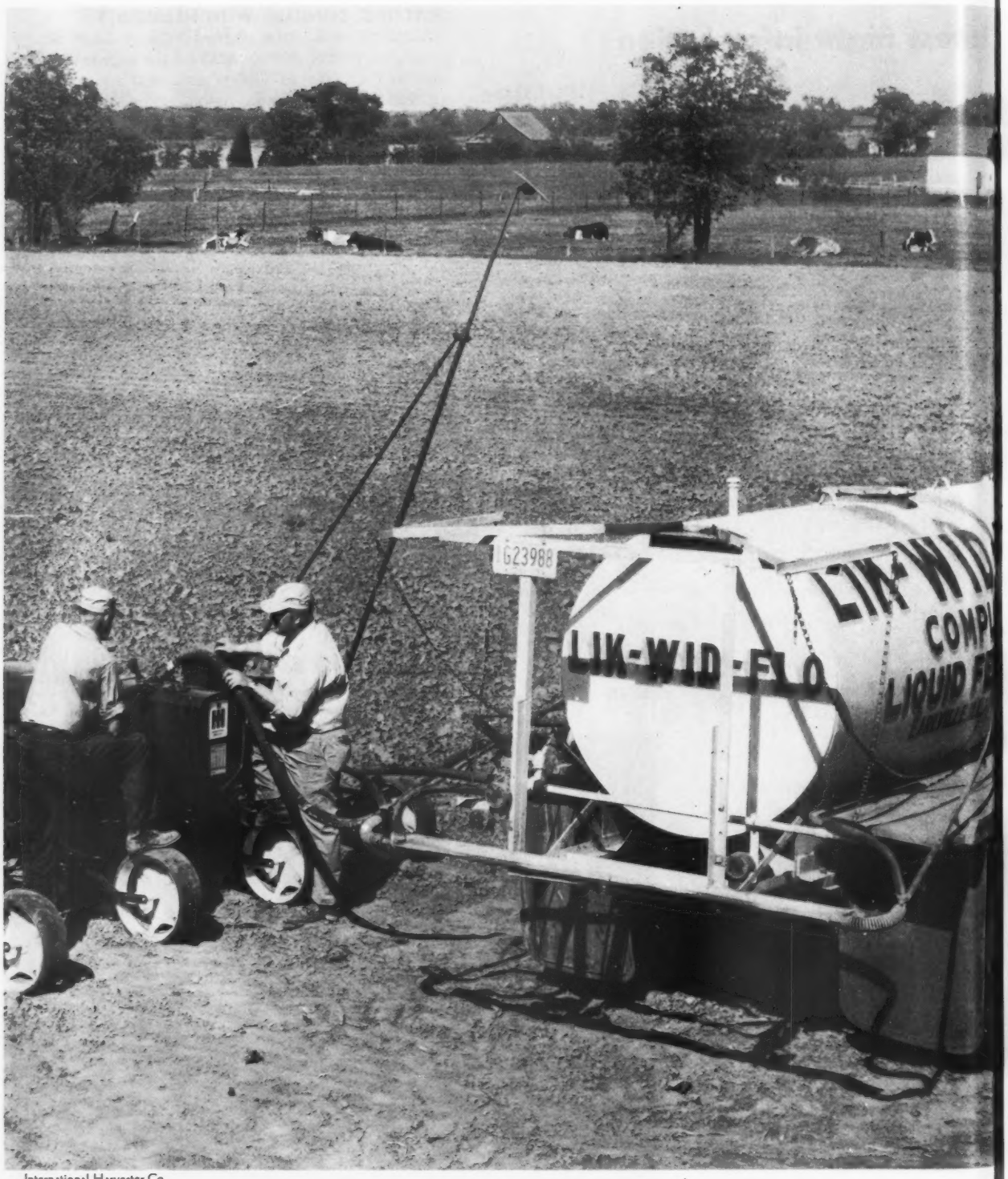
USDA was heavily represented at the Aviation Trades convention because the second Agricultural Aviation Research Conference, a government-sponsored meeting, was held November 10 and 11—also in Milwaukee.

NATA will hold its 20th Annual Convention in New Orleans, La., Nov. 16-20, 1959. In 1960, NATA will meet in Oklahoma City, Okla., Nov. 14-18. ▲

Some participants in NATA sessions on applicators safety and regulations: Oscar Bakke, Civil Aeronautics Board; J. McCausland, Civil Aeronautics Adm.; Wanda Branstetter, Agricultural Aircraft Assn.; J. H. Henley, Texas Aerial Applicators Assn.; Cliff A. Gaylord, Agricultural Aircraft Assn.

MATERIALS HANDLING
CUSTOM APPLICATION

WHAT FARMERS ARE S



International Harvester Co.

"All you lift is the end of the hose" is a reason often advanced for use of fertilizer solutions.

By THOMAS E. CLAGUE

SAYING . . .

about bulk, liquid and bagged fertilizers

THE FERTILIZER INDUSTRY is rapidly evolving. Many of the changes taking place bring questions to the minds of farmers. Questions such as, "What's wrong with buying it in bags like I always have? . . . What *is* this bulk blend business, anyway? . . . How is it better than buying it in bags? . . . Is there anything wrong with it? . . . What about liquid fertilizer? . . . Is it better than dry, or not as good? . . . Which gives me the most for my money?"

It's really not surprising that the farmer is confused on these questions lately, because the industry does present him with quite a complicated picture. There are proponents of all three of these approaches to plant food handling. And while all this goes swirling around the farmer's head, he is still just beginning to realize the true place of plant food in his production program. There are old wives' tales, superstitions and myths which are hard to dispose of, because they are based not on fact, but on fear. Such notions as "too much fertilizer will ruin the soil," for instance.

SOIL TEST IS FIRST STEP

The first and foremost question facing the farmer about fertilizer is very simple, and it has nothing whatever to do with arguments about the bagged——bulk blend——liquid approaches. It is: "Which plant food—and how much do I need?" The answer, of course, depends upon a good soil test and subsequent counsel and recommendations—based on past treatment of the soil, and crops to be produced. Any good fertilizer business surely must help the customer meet this first need. It matters little whether the testing is done by the federal-state extension service, the local Farm Bureau facility, the dealer, the fertilizer manufacturer, or a private laboratory—the simple fact of the matter is that any sound fertilizer program, for either the buyer or the seller, must be built on the firm base of a good soil test and recommendation.

After the farmer knows what he needs, he faces the question: bagged, bulk blend, or liquid? How can he know which way he should go——and why? To a large extent, his own situation will dictate his decision —his required plant food, when and how it is to be applied, and his equipment.

For instance, suppose he wants to apply fertilizer as he plants, and has a planter with a good dry fertilizer attachment on it. Because he finds it easier to fill hoppers from bags than to scoop from a wagon or truck, he is likely to decide against a bulk blended material. Also, he is apt to get more uniform "starter" results with a homogeneous product than with bulk blended materials which may segregate under the conditions of precision, pin-point application.

In areas where bulk blend is going big today, this is a basis for sale of much or most of the bagged material sold. The same is true, of course, for side-dressing during cultivation. The farmer is apt to buy in bags not only because it's easier to handle than bulk would be, if he has a dry fertilizer attachment on his cultivator, but also because of the importance of homogeneity in precision application.

TWO REASONS FOR BULK

On the other hand, if he needs to put on a heavy application before he plows, and he doesn't have a good fertilizer spreader, he may use bulk materials, either blended or straight, applied by truck. Even if he has the equipment to do it himself, he may let the trucker spread it for him because he can buy it, complete with the spreading, for less than he could buy a bagged product—and he saves himself work. These are the big reasons for the growth of the bulk blend approach—economy and convenience, according to those in it. The savings can be considerable—15 to 20 per cent, with the application included, depending upon the type of material purchased.

Of course bulk blend has its drawbacks too. One is that if the weather holds things up a bit, the blender may not be able to take care of everybody when they all get ready to go at the same time. There is some talk of soil compaction danger, but this may be less of a real problem than opponents would like to believe. It depends upon a number of variable factors, including time of year, and climate. In general, in regions where the soil freezes during the winter, compaction does not seem to become a permanent problem. Certainly not in the way that it does in some soils where the climate is warm. Thus, if bulk blend material is applied before fall plowing, there is little chance of compaction troubles. Of course, if it is to be applied in the spring, and the season is late and wet, then there is more possibility of compaction. The fact that bulk spreading of limestone, rock phosphate and other straight materials has been widely practiced for many years tends to weaken the compaction criticism, at least for temperate and cool climates.

LIQUIDS ARE CONVENIENT

What about liquids? Ease of handling seems to be the big consideration here—and again it depends largely upon the equipment. If the farmer has a liquid applicator for his planter, he will, of course,

continue to use liquid materials. If he has a dry applicator, then he would have to change his equipment in order to use liquid. In the main, those who have turned to liquid have done so because of convenience. "All you lift is the end of the hose," is the way some people put it. It is also possible to side-dress with liquid when cultivating, of course.

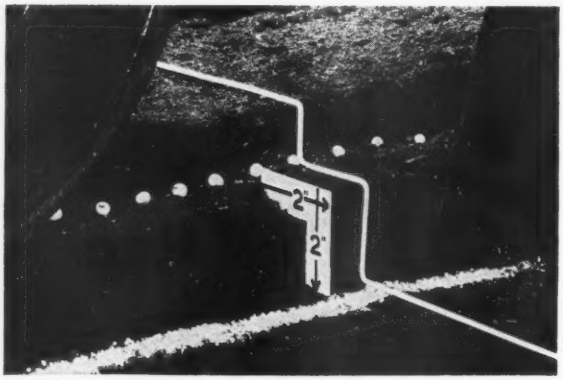
There seems to be a feeling that the physical dispersion of the liquid, once it's in the soil, tends to make it a less effective "starter" than dry material which remains concentrated. On the other hand, liquid is 100 per cent available, which gives it some advantage over dry materials—all of which further complicates the picture for the farmer. Another consideration with liquid is the storage facility that the farmer must have. Although an open tank might do, and he may need it only a short time, it's just another part of the equipment story that he must think of.

Liquid plant food is often custom-applied before plowing, in order to save work for the farmer. It is also possible to mix chemicals, such as herbicides for weed control, with the liquid, so as to do two jobs at once. In this case it might be sprayed on, probably by the liquid fertilizer dealer who might offer custom application as part of his service, although there is no reason why the farmer couldn't do it himself if properly equipped. However, liquid fertilizers are non-pressure materials which can be gravity-applied and do not require use of pumps, nozzles and knife-applicators; this is one of their advantages.

ANHYDROUS AND SIDE-DRESSING

All this, of course, excludes anhydrous ammonia from the liquid classification. A gas which is compressed until liquefied, and handled under pressure as a liquid, it is applied deep in the soil, where it turns to gas and is absorbed. Anhydrous ammonia is an economical source of nitrogen, but since this is the only element that can be applied with a given piece of equipment at any one time . . . it is somewhat limited, and so not many farmers own equipment to handle it. Anhydrous ammonia is ideal for side-dressing applications, as it furnishes what corn needs at that stage of growth.

One big advantage inherent in both the bulk blend and the liquid approaches is flexibility. Suppose the farmer needs an application of a formula that doesn't exist in bags—what does he do then? If he buys a bagged product that "comes close," he is getting more than he needs of something, and perhaps not enough of something else. But with bulk-blended or liquid material, he can get the formula that his test indicates he needs. This lack of flexibility is a limitation of bagged goods, in the eyes of some farmers.



Homogeneous material is important for precision applications such as illustrated here. This is a strong point of bagged granular goods. For best "starter" results, the small band of fertilizer must be uniform throughout, and some dry bulk-blended materials will segregate out in precision application, so that the band of fertilizer is not of uniform formulation.

On the other hand, the farmer can buy bagged material in complete confidence that he knows what he's getting—because every bag is labeled. And this is a problem that must be faced squarely by dealers in bulk blend and liquid materials. While it is perfectly obvious to the dealer that if he wants to stay in business, his product must be as represented, the farmer may not be so sure. He's been skinned before, and he expects to be again. So he may require some reassuring about the quality-control of the bulk blend or liquid he's considering buying. This is, of course, one of the inherent advantages of a bagged product for the suspicious farmer. In actual practice, of course, the policing done by the states does tend to assure a high level of quality control, and the farmer needs to be told about this.

A TIME AND PLACE

Which approach gives the farmer the most for his money? This, again, is not a simple or clean-cut matter. In terms of dollar cost and labor involved, the bagged approach is probably most expensive, initially, for the farmer, with dry bulk-blended materials giving him the most plant food for his money. Liquid materials probably fall some place in between, but convenience always enters the picture to complicate the decision. The final choice of the farmer will depend upon his own situation: labor supply, equipment, plant food needs, and comparative prices of bagged, bulk blend and liquid fertilizers.

Farmers today are, in many cases, faced with this decision. But if they had to consider only what's best for their crops and soils, there would probably be a time and place for each, in every farmer's plans. ▲

Custom spreading by truck saves a lot of labor, and is fine for plow-down practices. Bulk handling allows saving of 15 to 20 per cent of some materials, over the same amount in bags.

Bag Filling Machines

(Continued from page 32)

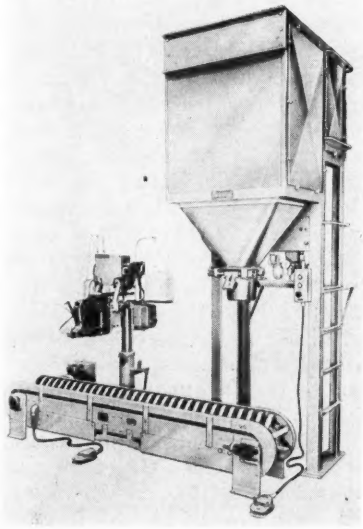
raised to change production rate. Most users report handling an average of 18 bags a minute for a full day's operation.

Maximum of 9′8″ head room and 3′ x 4′ floor space are required. Legs and principal working parts in the standard model are made of 12 gauge steel.

To get an illustrated brochure

CIRCLE 38 ON SERVICE CARD

BEMIS RAPID-WEIGH



The Bemis Rapid-Weigh Bagger, for open mouth paper or textile bags, weighs and fills 25 to 200 pound capacity bags with granular, pelleted or meal type fertilizers at speeds up to 24 bags a minute, Bemis Bro. Bag Co. has announced. Average weight accuracy is within two ounces.

All functional parts and those in contact with the product are made of stainless steel. Corrosion resistant paint is used throughout the bagger.

Bemis also manufactures a fertilizer packer, a complete packaging unit from product weighing through bag closing, with a production rate of 16 to 18 eighty pound bags a minute.

For more information on both machines,

CIRCLE 39 ON SERVICE CARD

RICHARDSON HA-39

An open mouth machine, the HA-39 fertilizer scale automatically feeds, weighs and bags 50, 80, 100 and 125 pound units at speeds up to 24 a minute, according to Richardson Scale Co., the manufacturer. Average accuracy is within two ounces.

Electrical controls are totally enclosed and the motor is 1 hp enclosed gearhead, with integral brake.

Contact parts are constructed of stainless steel and weigh hopper is of 12 gauge stainless plate.

Another model, the GA-17 gross bagging scale with feeder, also is offered.

To obtain brochures on Richardson's models,

CIRCLE 40 ON SERVICE CARD

STOKER PACKERS

Marketed by the Multiwall Bag Division of West Virginia Pulp and Paper Co., packers made by H. L. Stoker Co. are suitable for powdered, granular or pelleted fertilizers and pesticides. The Model 1-5, by means of 24 different types of delivery screws, can handle a wide variety of materials. Stoker valve packer models have attachments available for drum and open mouth bag filling. The 1-5 is adaptable for filling 5 to 250 pound bags and drums. Standard 1-5 dimensions are: height 54½″, frame width 38″, frame depth 33¼″.

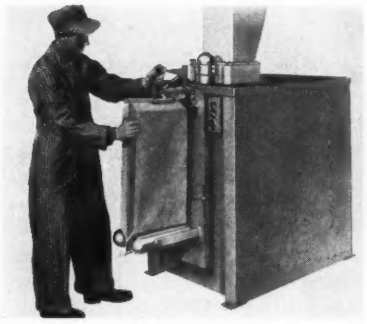
You can get more information on this and other models of Stoker packers if you

CIRCLE 41 ON SERVICE CARD

CODDINGTON AIR·PAC

Shown in the picture is the Air-pac valve bag packer made by E. D. Coddington Manufacturing Co. It will fill and weigh paper valve bags in 20 to 100 pound sizes, and can be equipped to fill open mouth bags, pails or drums up to 100 pounds.

The packer operates by air, without use of moving parts, after connection to a 100 volt circuit and a compressed air line. Height of the



Coddington Air Pac

machine without hopper or casters is about 50 inches.

An auger type machine also is available. Details on both valve bag packers are yours—just

CIRCLE 42 ON SERVICE CARD

BURROWS MODEL 700

The Model 700 Burrows Bagging Scale can be attached to a feed mixer or hopper. Hand operated, it will bag six to eight bags of free-flowing material a minute, according to its manufacturer, Burrows Equipment Co. The bag clamp is designed to handle paper, cotton or burlap bags.

Up to 160 pounds can be weighed with the scale, which is constructed of aluminum and steel castings.

For further details,

CIRCLE 43 ON SERVICE CARD

PEST REPORTS

By Kelvin Dorward

The spotted alfalfa aphid, which has been of little concern during the greater part of the year, increased materially in several areas during November. Populations were so heavy in one Franklin County, Va., seedling alfalfa field that the field was abandoned to be re-seeded in 1959. Two other fields in the same county were reported to have heavy infestations.

Counts in some young alfalfa fields of central and north central Oklahoma averaged 250 per sweep. Controls were applied to many young alfalfa fields but counts were low in older fields of the same area.

Following an extremely dry fall in Kansas, counts during November were the highest recorded for the year. In the eastern third of the state counts ranged from 100 to more than 6000 per 5-plant samples. Hunt County, Tex., had populations which ranged from medium to heavy.

The spotted alfalfa aphid was collected in Union County, Ill., but counts were not made. In Cache and Box Elder Counties, Utah, populations were light but were heavier in southern counties. During November additional light infestations were discovered at Rogersburg, Asotin County, Wash. The aphid was found in Washington for the first time in 1958 and is now known to be in five counties of the state.

The southwestern corn borer has been found for the first time in Mississippi County, Ark. This insect, which in 1950 was found for the first time in the state in Sebastin and Franklin Counties, is now known to be in all counties. The spread has been most rapid in the main corn producing areas.

Although ***greenbug*** populations remain relatively light, sufficient numbers are present to be of concern next spring providing conditions are favorable for development. The insect was easily found in 19 panhandle counties of Texas. Colonies were found in the larger wheat clumps. All stages of the aphid were found in fall-seeded grain fields of 15 counties of the northeastern area of Oklahoma. Populations averaging 50–75 per linear foot were recorded in some localities with even higher counts in clumps of volunteer plants. In Maryland the greenbug damaged young orchard grass seedlings at Clarksville, Howard County.

The pink bollworm of cotton, which was found earlier this year in Maricopa County, Ariz., for the first time since 1947, has now been found in new areas of Arkansas and Louisiana.

Within recent weeks specimens of this serious cotton pest have been taken for the first time in Ashley, Clay, Drew, Faulkner, Mississippi and White Counties, Ark. These counties are all east or northeast of the presently established quarantine line. Within the regulated area of Arkansas, larvae have been collected in Little River, Howard, Hempstead, Miller, Lafayette, Columbia, Clark and Crawford Counties.

Specimens have been taken in four Louisiana parishes outside the regulated area. Collections have been made in Union and Lincoln Parishes which had been, at one time, previously infested and in Rapides and Grant Parishes, infested for the first time.

Inspections of gin trash, lint cleaners and gin stands showed pink bollworm infestations in 18 Oklahoma counties. The Oklahoma infestations in 1958 were heavier than in any previous year. Gin trash inspection of 591 bushels in 26 central and eastern Texas counties resulted in the finding of 83,844 larvae, or an average of 141.75 per bushel, compared with 16.49 or eight and one-half times the number found per bushel in 1957.

In early November the pink bollworms were heavy in green bolls on about 300 acres and moderately heavy on 700 acres in southern Dona Ana County, New Mexico. Cotton gin lint cleaner inspections of 54 gins in five counties revealed 336 pink bollworms from a total of 30,546 ginned bales.

Although truck crop insects were relatively light throughout the country during November, a few pests caused concern. ***Aphids*** were severe on spinach in the Arkansas River Valley of Oklahoma between Haskell and Sequoyah Counties. The insects were also heavy on garden turnips in Payne, Logan, Lincoln and Osage Counties and were killing turnips in Marshall County. Aphids were also heavy on various vegetables in Lee, Baldwin and Escambia Counties, Alabama.

The potato leafhopper was heavy on string beans in the Spring Valley area of San Diego County, Calif. In the El Centro area of Imperial County ***cabbage loopers*** were severe in lettuce plantings. The looper was again building up in lettuce fields of Eddy County, N. Mex., and damage as high as 30 per cent in some Dona Ana County fields was reported.

Peppers in the Painter, Va., area maturing before October 7 were damaged an estimated 25 per cent by the ***European corn borer.*** Similar infestations were reported from other locations on the Eastern Shore of Virginia. Generally, the infestation in 1958 was one of the highest on record for the Eastern Shore. The European corn borer did more damage to sweet corn in this area than the corn earworm.

An egg mass survey indicates a possible increase for 1959 in the area of heavy defoliation by the ***forest tent caterpillar*** in St. Louis County, Minn., area north of Duluth. Counts averaged 10.5 egg masses per tree in 21 plots over the entire area, with as high as 28 egg masses per tree in some plots. Complete defoliation can be expected with 10 egg masses per tree.

Screw-worms in cattle, sheep and hogs were reported from the Ione area of Amador County, Calif. These insects became more active in Custer County, Okla., during late November and cases were reported from Louisiana and Mississippi in late October. ▲

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Entomological Society Meets at S

- INSECT HORMONES
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  promote a fresh look at man's aging
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- SAFETY
  need for emphasis on accident prevention and cooperation between physicians and pesticide applicators
- MALARIA ERADICATION
  possible in most of world within 10 years
  radioactive Cobalt-60 may make screw-worm, malaria-carrying mosquito extinct
- INSECTICIDES
  microbial insecticide progress reported
  new systemic promising for cattle grubs
- FIRE ANT
  venom as antibiotic and insecticide
  official comment on wildlife controversy

USDA Photo

Dr. R. L. Metcalf (right) hands over the ESA gavel to **Dr. Paul W. Oman,** new president of the Society, at the annual meeting.

GROWTH OF INSECTS and cancer in man may not be very far removed from each other if what Dr. Carroll M. Williams of Harvard University says is true. And there is little room to doubt him. "A brilliant zoologist," Williams was the first researcher to isolate the juvenile hormone, and is the leader in American science in the study of growth regulating hormones of insects.

Speaking before the Entomological Society of America's Sixth Annual Meeting in Salt Lake City, Williams presented the annual L. O. Howard Memorial Lecture, highlight of the Society's four-day meeting.

The Harvard zoologist's lecture was spoken of as being "a follow-up and a technical enlargement" of the arresting article published in *Life* magazine in November. The 42-year old Williams explained that "insects have much to tell us about ourselves." He added that knowledge of insect hormones "will promote a fresh look at (man's) grim business of aging." He revealed that the juvenile hormone is present not only in insects but also in humans.

Ecdysone, a hormone which makes insects molt (pass from one stage to the next), Williams reported, has been found to reduce and stop the growth of tumors in insects. He inferred that the answer to cancer in humans may lie in such a hormone.

Hormones Promising as Insecticides

From the agricultural standpoint, growth stimulating and retarding hormones may have great value. Williams pointed out that when hormones are applied to insects at the moment when their systems cannot use it, bugs will "commit ecological suicide."

While highlighting the ESA Meeting, Williams' lecture, "Metamorphosis, a tool for the study of growth," was just one of over 300 technical papers presented in Salt Lake City December 1 to 4. Research reports ranged from organophosphorous insecticides and systemics to the effects of gravity's pull on insects and the advisability of licensing entomologists. "A very successful convention," reports Robert H. Nelson, Executive Secretary of the Entomological Society of America. "In size, it was second only to last year's meeting. We had about 650 registrants from all over the United States and from Canada and many foreign countries."

Dr. Carl Frischknecht of Utah State University sounded a word of warning to entomologists and others who come into contact with insect poisons. Said Frischknecht, "More emphasis needs to be placed on prevention of accidents and injuries involving pesticides and less on curing people suffering

at Salt Lake City

By PETER C. CROLIUS

effects from improper handling and use of these toxic materials." He listed the most common causes of pesticide accidents as improper labeling and storage, failure to follow directions, careless container disposal, negligence in handling and failure to observe personal hygiene.

Following up the medical angle, Dr. Joseph H. Holmes, Professor of Medicine at the University of Colorado, called for increased knowledge of pesticides by local practicing physicians. Holmes said that this knowledge should include who is using pesticides, when they are using them, the type of materials being used, symptomatology, and available therapy. Doctors should also be aware of the composition of both solvent and active agent, he stated. Prompt diagnosis of pesticide poisoning may prevent needless suffering or death. Summing up, Holmes emphasized that "the most important aspect in control of insecticide poisonings is a cooperative effort between the medical profession of a community and persons using insecticides in that community."

According to Dr. Fred L. Soper of the World Health Organization, malaria can be eradicated from most of the infected areas of the world within ten years. Soper added that any specific area may be rid of the disease within five years. For total eradication, the United Nations specialist pointed out that full cooperation must be exacted from both those areas which want to get rid of malaria and those areas which have already rid themselves of it.

Radiation for Mosquito Control Next?

The screw-worm and the malaria-carrying mosquito may have something in common in the future, according to four USDA scientists reporting at the ESA meeting. Both may become extinct from the same substance—radioactive Cobalt-60. Laboratory tests indicate that male mosquitoes irradiated with gamma rays from Cobalt-60 fail to fertilize eggs and no offspring are produced. (USDA and cooperating states in the Southeast started a full-scale screw-worm eradication program last summer which employs Cobalt-60 to sterilize the male of the species.) Researcher A. N. Davis, reporting for the four-man team, indicated that practical use of irradiated male mosquitoes as a control measure poses problems of cost, labor, and large-scale rearing.

A "living insecticide" for moth-type truck crop and forage crop pests has been used successfully and will shortly be on the market (*see* "Washington Viewpoint" *page 8 this issue*). Drs. Hall and Andres, California Citrus Experiment Station at Riverside, reported that treatments with *Bacillus thuringiensis* gave as good or better control of cabbage looper and imported cabbage worm than equivalent per-pound dosages of chemical insecticides. The bacillus acts on the worms like a stomach poison but the *microbial insecticide*, first one to be produced commercially for foliage spraying and dusting, has no detrimental effect on beneficial insects nor on warm-blooded animals. Each gram of the insecticide contains about 100 billion spores of the bacillus.

A new systemic insecticide for control of cattle grubs provides control amounting to 94 to 100 per cent, according to USDA entomologists Eddy and Roth. Working with beef cattle at Corvallis, Ore., the pair administered Dowco 109, an organophosphorous compound, both orally and as a spray. As a spray, it gave 99 to 100 per cent control of the costly grub. The new chemical, said Roth, gave excellent results used in either manner. The chemical is not yet available to cattlemen.

Fire Ant Venom: Antibiotic, Insecticide

Louisiana entomologists Callahan and Blum described work now being conducted at Louisiana State University on fire ant venom. It's not all bad, they report. The venom has exhibited strong antibiotic activity against several medically important bacteria and molds in their tests. (Antibiotics are generally active against either bacteria or molds but seldom against both.) Putting their observations in laymen's terms, Callahan and Blum said that fire ant venom under the microscope looks like chicken soup (taste results were not immediately available) and that the antibiotic factor "smells like a wet dog." Venom is toxic to boll weevil, rice weevil, fruitfly, and to some species of mites and termites. While varying in its degree of activity, fire ant venom can produce paralysis.

Commenting on the Southeastern fire ant eradication program, E. D. Burgess, Director of USDA's plant pest control division, noted that despite strong protests by conservationists to discontinue use of toxic chemicals, "the total impact to eradication treatment on wildlife will be inconsequential." Burgess pointed out that farmers themselves and local governments are contributing heavily to the eradication program, that "as a group there are probably no others as interested as those engaged in agriculture in maintaining an abundant supply of wildlife." (*See November*, 1958, FARM CHEMICALS, *page 32*). He noted that many complaints were received during the massive *Mediterranean fruitfly eradication program* but that despite them and heavy odds, 7 million acres were successfully treated. (At the end of November, USDA announced that not one Medfly had been trapped in the previous year.)

Drosophila versus Acceleration

The Whirling Dervishes have nothing on a family of fruit flies from Beltsville, Md. Singled out for initial space biology studies because of short life cycle and ability to live in a test tube, the fly family was subjected over a period of weeks to a force of 10 G's (ten times the force of gravity). This force approximates a space vehicle's launching acceleration. Reared through two generations in a centrifuge (240

rpm on a 6-inch radius), 40 per cent of the spinning flies developed and reproduced under the sustained pressure. Results of the tests provide basic data for the time when man is sent into space.

ESA's Utah meeting was sparked by a welcoming address by Governor George D. Clyde. The Governor explained that Utah is largely an agricultural state, and that infestations of the Mormon cricket in the 1800's gave the people of the state an early interest in entomological science. He pointed with pride to how the people of Utah have made the desert "blossom like a rose."

Dr. Paul W. Oman, USDA entomologist, succeeded Dr. R. L. Metcalf of the University of California as President of the Society. Merlin P. Jones, Federal Extension Service entomologist, became President-elect to succeed Dr. Oman next year.

Eastern Entomologists Emphasize Controls at Baltimore Meeting

Insect control measures took the limelight at the November meeting of the Eastern Branch of the Entomological Society of America. Practical considerations dominated the usually academic conference at Baltimore's Lord Baltimore Hotel, November 24 and 25.

Four hundred meeting-goers heard over 80 technical papers read and discussed at the two-day conference. Chemical control research was the leading topic, but also discussed were biological insect control, pesticide laws, insect biology and classification, and problems of the home owner.

The meeting was the thirtieth of the Eastern Branch. Delegates came from New England and the Middle Atlantic states.

Showing the role of entomologists in the Space Age, Dale W. Jenkins of the Biological Warfare Unit at Fort Detrick, Maryland, explained some work of entomologists in outer space research. He pointed out that insects lend themselves to space study because of their tolerance for radioactivity, gases, and higher than normal pull of gravity.

Biological Insect Control in Canada

According to Dr. Bryan Beirne of the Belleville, Ontario, entomology lab, research in biological insect control is moving at a fast pace in Canada. He emphasized that since Canada's vast land and forest area makes chemical control difficult, employing an insect's natural enemies may well be the answer north of the border.

Commenting on biological control of the European corn borer by the spotted lady beetle, Marlin S. Conrad showed that in Delaware tests only about 15 per cent of borer egg masses were eaten by the beetles. Some investigators, he said, give the beetle credit for destroying 50 per cent or more of the eggs while others consider it of little importance.

Aerosol treatments of lactating dairy cows are economical and labor-saving, according to Drs. Cheng, Frear, and Enos of The Pennsylvania State University. Arranged strategically on a frame, aerosols containing methoxychlor, pyrethrins and other ingredients were released on cows by use of a photoelectric triggering device. The investigators reported that by this method, insecticides cost between .6 and 1 cent per animal per day on a one-spray-per-day basis. They added that none of the milk sampled after spraying showed measurable amounts of methoxychlor.

Maryland entomologists Phillips and Bissell reported that two new systemics, 12880 and 18706 (American Cyanamid), showed promising results against the pea aphid giving 97 per cent reduction after 16 days. These chemicals also gave quick reduction of alfalfa weevil adults. 12880 also substantially reduced weevil larvae in the Maryland tests. Negligible amounts of chlorosis were produced by the new systemics.

Birdsfoot Trefoil Insects

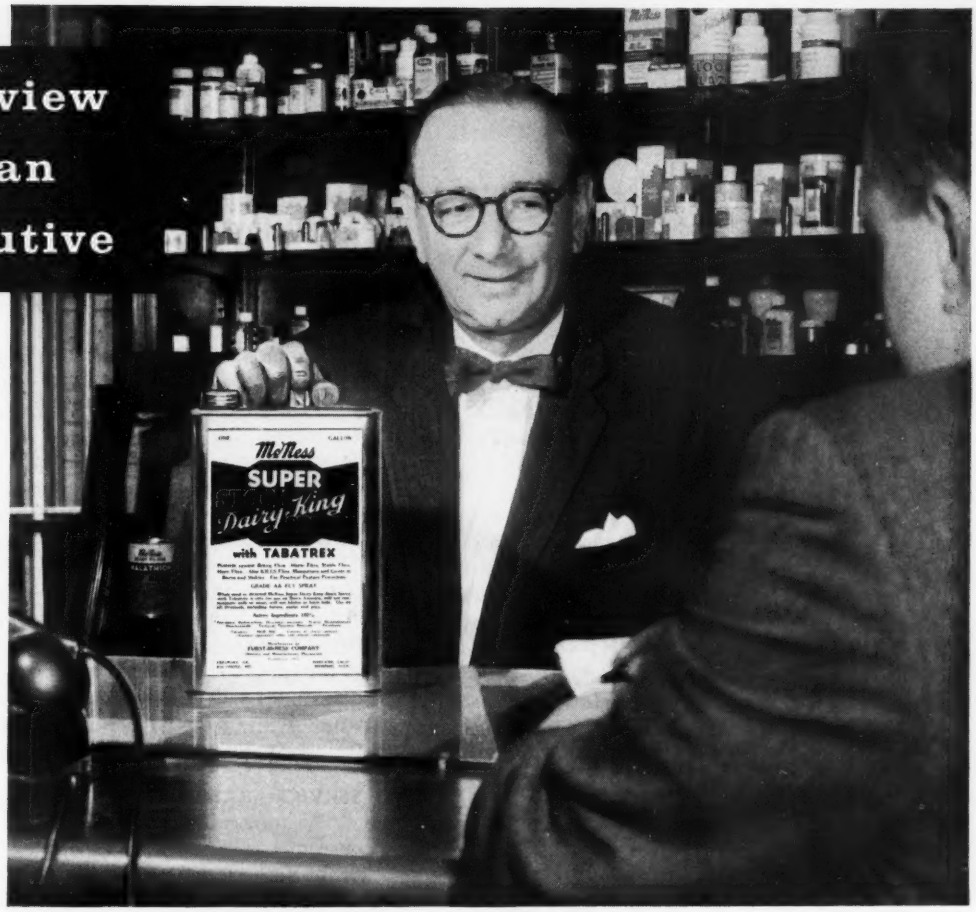
The increasing plantings and variable seed yields of birdsfoot trefoil in New York led Cornell researchers Ridgway and Gyrisco to study trefoil insect control. They reported that against the lepidopterous leafroller, phosdrin at 0.5 pounds per acre and parathion at 0.5 and 1.0 pounds per acre "gave good control"; that against the meadow spittlebug lindane gave significant increases in forage and seed yields when applied in early spring; and that the use of pre-bloom parathion and aldrin treatments to control plant bugs "certainly shows promise of increasing seed yields."

In Niagara Chemical Co. experiments, Thiodan gave excellent control of aphids, potato beetles, potato leafhoppers, and Colorado potato beetles on both early and late varieties of potatoes, according to D. H. Moore of Food Machinery and Chemical Corp.

Other chemical insecticide testing on potatoes was described by R. N. Hofmaster of the Virginia Truck Experiment Station at Painter. Dr. Hofmaster explained that aldrin and heptachlor at 2.5 pounds actual per acre and dieldrin at 1.5 pounds actual per acre still gave reduction in foliage damage up to 94 per cent three seasons after treating the soil.

A trio of investigators from the Maryland Agricultural Experiment Station reported on pre-planting and post-emergence applications of dieldrin, heptachlor, and toxaphene on spring spinach. H. D. Newson, J. T. Whitlaw, and L. P. Ditman explained that none of the treatments—applied at two and four pounds per acre—completely controlled injury by chewing insects and none completely controlled garden webworm. (Toxaphene has not been approved for use on spinach.) ▲

Interview with an Executive



Mr. Charles Furst
President of
Furst-McNess Company
Freeport, Illinois

(Freeport is located in Stephenson County, the leading dairy county in the State of Illinois. Mr. Furst is well acquainted with dairy problems and requirements.)

Question: Will the McNess Cattle Spray contain TABATREX again this year?

Answer: IT CERTAINLY WILL!

Q. Mr. Furst, what is that can on your desk?

A. This is our McNess Dairy King Super Stock Spray which we introduced last summer.

Q. Introduced? Is this the first cattle spray you have ever sold?

A. No, indeed. However, this one is different from our previous products because it contains TABATREX insect repellent.

Q. How did sales of this new product with TABATREX compare with sales of previous products?

A. They were significantly greater. In fact, our sales of the new cattle spray were greater than in any year since 1946.

Q. To what do you attribute these increased sales?

A. First, to the fact that we had a superior product. We know that this is so because many of our customers have reported increased milk production after using the McNess Spray on their herds.

Q. Was there anything else?

A. Yes, there was. The advertising and educational campaign put into effect by the Glenn Chemical Company last spring and summer was highly effective. Consumer interest was intensified, and consumer demand was heavy. Frankly, we're quite enthusiastic about our results in 1958.

Q. And what about 1959? Will the McNess Cattle Spray contain TABATREX again this year?

A. *It certainly will.*

Your Cattle Spray should contain TABATREX too. Register your label now.

For approved labeling and complete information, write or phone:

GLENN CHEMICAL COMPANY, INC.

2735 North Ashland Avenue
Chicago 14, Illinois
Phone: EAstgate 7-9350

Manufacturers of

Tabatrex
INSECT REPELLENT

Old hands at telling industry about farmers' ways are Iowa State University rural sociologists George M. Beal (left) and Joseph Bohlen. Here they're in action in Cincinnati—telling the flannelgraph story of new idea diffusion.

Warnings are theme of the day as NFSA spokesmen look ahead in this business of

FERTILIZER SOLUTIONS

don't stand still with tod

PROGRESS IN THE FERTILIZER solutions industry demands elimination of two big drawbacks—customer confusion and the lack of a "supermarket of services." That's the opinion of F. M. Chester, vice president of Schelm Brothers, Inc., manufacturers of tanks and equipment for the booming liquid fertilizer business. "*If we'd quit bellyaching about our competitive methods of operation and would think only of the customer's needs, we'd eliminate these drawbacks*," he said. Chester, pioneer and leader in development of aluminum tanks for the solutions industry, made his remarks during the panel, "Planning for Profits," at the November meeting of the National Fertilizer Solutions Association in Cincinnati.

"The customer cannot and will not wait very long to spend his money with you," warned Chester. "In order to convince the farmer that you are in a position to net him greater profits, you must have the operation to prove it." This includes, he said, correct equipment for your particular area and versatile and sufficient equipment to render fast, efficient, satisfactory, and profitable service.

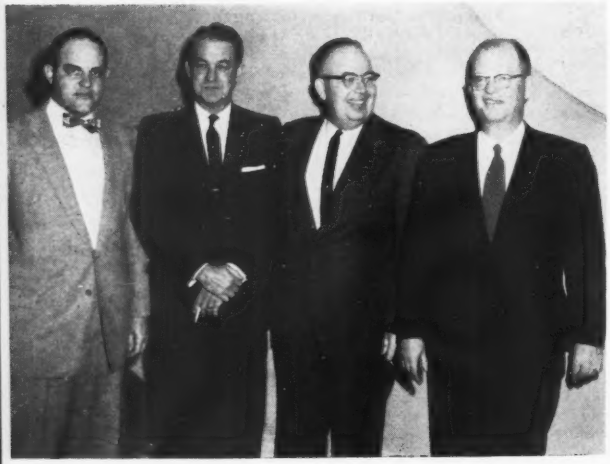
SERVICE—BASIS OF BUSINESS

"We must put ourselves in the position that the customer will know that the least of his operating problems is fertilization." Chester added, "There is absolutely no way for the equipment or any other part of this industry to succeed unless we are willing to consider this industry as a business, not as a catch-as-catch-can, come-and-get-it deal."

The NFSA convention was attended by more than 300 dealers, wholesalers, manufacturers, and chemical producers in the fertilizer solutions field.

Presiding during the meeting were Association President Richard Cecil, Owensboro, Ky., and E. E. Crouse, executive vice president, Liberty, Ind.

Elected to serve as NFSA officers during 1959 were: President, O. L. Ohnstad, Ohio Liquid Fertilizer, Inc.; Vice President, Hugh S. Surles, Jr., Planters



NFSA officers for 1959: Secretary Edward A. Wex, Treasurer John L. Wilson, Vice President Hugh S. Surles, Jr., President O. L. Ohnstad.

Planning for Profits panel: F. M. Chester, William W. Arnold, moderator E. E. Crouse, presiding officer William B. Parrish, Stewart D. Daniels, Donald R. Webber. See story for their topics.

Cotton Oil and Fertilizer Co., Rocky Mount, N. C.; Secretary, Edward A. Wex, Badgerland Liquid Fertilizer Corp., Milwaukee; and Treasurer, John L. Wilson, Semo Liquid Fertilizer, Inc., Charleston, Mo. Muriel F. Collie will continue as Executive Secretary of the Association, which has headquarters at 2217 Tribune Tower, Chicago.

MANAGEMENT SHOULD BE HEARD

Featured speaker at the November 18 general session was Dr. Samuel N. Stevens, of Stevens, Thurow & Associates, Chicago administrative consultant firm. Summarizing his talk, "A Changing Economic Society—Challenge to Business Leadership," Stevens said, "*Business leaders must be prepared to furnish intellectual leadership beyond the confines of the economic mission of the corporations to which they are attached.* They must have something to say about the problems of our times. They must speak out for, as well as against, individuals and policies which promise to strengthen, or threaten to weaken, the character of the people or the quality of our social institutions."

Appearing with F. M. Chester on the planning-for-profits panel were Stewart D. Daniels, Monsanto Chemical Company, who spoke on *production and inventory control;* Donald R. Webber, Spraying Systems, Inc., talking on *standardization;* and William W. Arnold of Nitrogen Division, Allied Chemical Corp., who spoke on *solutions production equipment.*

"Don't buy equipment on the basis of initial cost only," warned Arnold. "Look for the equipment which will do the job with the least maintenance and operating expense, the best trouble-free service."

Misinformation and poor judgement cause poor plant design, high maintenance costs, and excessive operating expenses—"pickpockets of production," Arnold stated.

Examining these "purse pluckers" Arnold noted that during the busy fertilizer season, it's necessary to keep manufacturing the product with as few equipment failures as possible. Corrosive materials, he said, add greatly to chances of breakdown. Overlook initial investment, he suggested, and consider stainless steel alloys, neoprene linings, and specialized plastics.

CONSIDERING CORROSION

"Pressure tanks are more expensive to build than equivalent capacity non-pressure tanks . . but don't overlook the possibility of using air pressure to transfer liquids . . . It is extremely economical." *Arnold pointed out that non-corroding pumps are expensive and if these same pumps are used for handling other solutions, particularly those of high salt content, they are prone to damage.*

The solutions specialist brought to the attention of panel members the fact that tanks lined with *fiberglass-reinforced epoxy resins* are new entries to the anticorrosion battle. He pointed out that these resin-lined tanks are very versatile—with both nitrogen and complete fertilizer solutions.

EXPANSION AND CHANGE

Ending his production equipment talk, Arnold cautioned plant builders to "*keep informed on new developments in the industry, plan construction so that future expansion can be carried out with minimum expense, and don't be complacent with present-day methods of making fertilizers in an industry as new as this one.*"

Twenty-seven industry suppliers exhibited goods and services during the three-day convention.

Purchase of the magazine *Fertilizer Solutions* from a private publisher was consummated during the convention. It will be published by the Association at its Chicago headquarters every two months. Until bought by NFSA, it was published quarterly.

Started four years ago as the National Nitrogen Solutions Association, the NFSA includes in its membership chemical producers, solutions dealers, wholesalers, and manufacturers of nitrogen solutions and/or complete liquid fertilizers, manufacturers of products used in handling, storage, and application of liquid fertilizers, and manufacturers of component parts of such products. ▲

Sound Pricing Policies

(*Continued from page 18*)

split shipments. Obviously, the lower carload price is based on the supplier's reduced costs of handling and shipping. But where the shipments are split, where the buyer doesn't have investment in inventory, we don't really achieve this cost reduction.

So, is this service, or is this a price cut?

▶ You've all probably heard of the virtually perfect "seconds" that are offered in sweeping sales of consumer goods. They might be men's shirts with a slight defect in the shirt tail, for example. Well, there are variations of this gimmick in industrial selling, too. The price-cutting is justified by pretending to offer *substandard material* when it really isn't offgrade, or when the irregularity has no commercial significance.

▶ Naturally, there is such a thing as *offgrade material* and special inducements may be required to dispose of it. Many reliable manufacturers rework their substandard product, where this is feasible. They also try to use it captively, or to surround its distribution with special precautions, so as to maintain the stability of their price structure. However, the wheel-and-deal producer will utilize offgrade material as a chance for price-cutting, and the practice can grow until prime goods are sold as seconds to camouflage the price cut.

▶ A variation is to employ *tie-in sales,* holding out the attraction of so-called substandard material at a lower price as a reward for purchasing a certain amount of prime product. Of course, tie-in sales are also used to high pressure the sale of slow-moving or unattractive items.

▶ The cagey price-cutter sometimes tries to cover his tracks by *dumping his product* at a very low price through general resale outlets, where his product will lose its identity. However, the news of such dumping always gets out. Talk about the grapevine among gossiping women—they could learn a thing or two by watching the news travel on dumping or price-cutting in an industrial market. On more than one occasion we have observed processors express criticism of their basic suppliers for moving some of their production through unofficial dumping channels.

We have heard them say: "I can buy that company's stuff cheaper from others than directly from them—who are they kidding?"

▶ This doctrine of trying not to let your right know what your left hand is doing, can evolve into some fancy and sophisticated dealings. Like *the export agents who sell goods at cut prices in home markets.* We all know the exporter's story of having to meet lower price competition in some foreign markets.

▶ Besides that, there is the agent's commission. But if the material is resold domestically at the lower price, or if *the agent splits his so-called export commission with a domestic buyer,* what does this do to price policy? Of course, the manufacturer may not literally be in collusion with the price-cutting agent, but can he excuse himself by just looking the other way? It would seem that he can always demand dock receipts and onboard bills of lading to make sure that the material moves out of the country.

▶ Then there is the matter of *allowing domestic agents to split commissions to undercut your published prices.* This, too, can be policed by the producer.

▶ How about the *price concession on long term contracts*—is it in line with the savings actually developed by the long term contract? And the price reduction that supposedly reflects the savings by elimination of technical service—can it be justified by measurable figures? These things may be difficult to assess on a spot basis from the outside, but the manufacturer knows if he is allowing price accidents to happen. And if he is, the price accidents will compromise his basic price policy—and I am convinced that this will communicate itself to the market at large and be one more influence tipping the scale in the direction of unstable prices.

This list could go on and on, but we need not labor the point. I invite you to consider them as starting examples of the problems posed by the "gray area" between principle and practice in industrial pricing. They show that industrial managements can detour, undermine or compromise the principles of creative pricing which in general they endorse and formally adopt.

A BUYER'S DESIRES AND CRITICISMS

Before we move on, however, I'd like to place on the record my belief that the buyer is often just as unhappy with wheel-and-deal price fluctuations as the producer who wants to adhere to consistent price policy. At a recent Chicago meeting of the Plastic Housewares Manufacturers, a number of the housewares molders expressed severe criticism of the price practices of producers supplying them with plastics materials. One of them said, in effect:

"When you producers were selling polyethylene to us molders at the stable price of 41 cents a pound, my company made more money than we do now, when the price is much lower but bounces up and down with every deal. Why? Simply because I didn't have to spend all my time rushing around to see if I can make as good a deal as the next guy . . . and never being quite sure.

"I am basically an engineer and I used to spend most of my time designing new products and building more markets. Now, I'm too busy trying to be a price detective to get any constructive work done. I'm telling you suppliers—and the others at this convention will back me up—that all of us made more money when we paid 41 cents a pound than we do now, when the list price is theoretically 6 cents less but everyone knows that the price might be anywhere from 25 to 35 cents.

"Like any buyer, I want the lowest price reasonably possible, but if it has to be at the expense of my peace of mind and the creative part of my work, then I'll take the stable price even though it is higher."

That was quite a mouthful to get from a customer in an open meeting. But I am sure that many other buyers feel the same way. In this case, the industry was told that it didn't know how to run the pricing phase of its business. A buyer told us because he recognized the importance of consistent pricing to his own long term interest.

STABILITY AND LONG-RANGE PLANNING

I think it is encouraging, too, that the importance of price stability to long-range planning is getting recognition in other quarters. Let's take a look at an article in the January 27 issue of *Steel* magazine, quoting Mr. Leonard H. Krieger, president of the Institute of Scrap Iron & Steel, Inc. None of us need to be reminded, of course, of the historically wide swings in steel scrap prices. Well, here is what Mr. Krieger said to delegates at the Institute's annual meeting:

"Wouldn't our industry be better off to handle a full complement of material it's geared to handle—stocking more material on falling markets to sustain better price levels and creating reservoirs to meet the next pressure of rising operations. I fully believe we would handle more tonnage at a better average profit and that the range between the low and high price in any move would be narrower."

And why is this important? Because, as Mr. Krieger points out, it will help achieve the stability which steel mills are looking for in their expansion plans.

If I may be excused for drawing on the experience of my own industry, I can cite other examples of the constructive effect of creative pricing. In certain phases of the coal tar products industry, we had to learn the hard way the need for reaching beyond destructive price competition. In the case of one product there was great price instability as recently as eight years ago; and there was, in fact, a price for every job. Among other things, all the producers got tired of operating with low revenues. However, there was also the influence of endless price competition of lower quality products from another field, the prices of which we could never match. The answer was to move our efforts into the development and promotion of a quality line, and with this has come the achievement of reasonable price stability and consistent price policy.

A somewhat similar performance in reaching price stability has been achieved in coal chemicals in recent years. Where once the prices varied all over the map and the products were falling behind in quality progress, today the producers are concentrating on the upgrading of quality and giving consumers the benefits of greater quality values. It is significant that this field is now in an era of progress and growth, and consistent price policy has been a constructive factor in this development.

When a man assumes the role of critic—as I have—he is usually expected to come up with the right answers to the problems he introduces. Well, I confess that I have no prescription—no panacea—that will cure our pricing ills. In fact, as I have said before, the complexity of price decisions, combined with the heavy pressures of competitive demands, automatically rule out any simple formula.

But I do believe there is enough evidence on record, and enough experience under our collective belts, to be reasonably sure of the direction that a pricing policy will take us along the road of business progress. I think also that the direction signs on the road point out as well the penalties that we will surely pay if we do not maintain the most consistent price policy within our power.

For one thing, the lack of a clear-cut policy is going to make it that much tougher to fight the cost-price squeeze which has hampered American industry in recent years. It follows naturally that if we don't improve our individual performances in this respect, our friends in the investment world are going to play it even closer to the vest; and we may find the task of getting capital for our growth needs much more difficult. Other phases and objectives of our business will be adversely affected, too.

A BROAD BASE OF BENEFITS

Our expansion plans will be cramped or aggressive, depending on our ability to show a good earnings performance and to attract investor interest in our growth. The same is true of our research and development programs, of our drive to create new products and open new markets. Unless our price policy is geared to the attainment of these goals, I am afraid we are going to pay the penalty of throttled growth.

On the other hand, the benefits of creative pricing have a broad base, extending through individual companies and industries, and affecting the health and vigor of our whole economy.

If we stick to a consistent price policy, I feel it will give more assurance and stability to our planning for the future. Like the housewares molder I told you about earlier, we will have more time and energy to give to the really creative part of industry. We can plan for physical expansion, for new product development, for more efficient production, for more useful products, and for better earnings performance.

If we stick to a consistent price policy, I am sure we are all going to have greater "price respectability" in the market. We are going to sell *both* dependable products and dependable prices. We are going to lessen the risk of losing a good customer because he may fear that his competitor is buying cheaper than he is. We are going to achieve the benefits that come with stability, openness, and fair play.

Finally, if we stick to a consistent price policy, I believe we can do more toward strengthening and stimulating our economy than any government planning group can ever hope to achieve. We can help erase the "feast or famine" situation that often prevails in price-only competition. We can do our share toward leveling out the peaks and valleys of industrial activity, so that business and industry can plan for steady progress. In helping make this possible, I believe we are ultimately serving the needs of all of the American people. ▲

NEWS OF THE INDUSTRY

SW AGROCHEMICAL AND FIRST MISSISSIPPI JOIN IN NEW ARIZ. NH_3 PLANT

A 60 ton per day anhydrous ammonia plant will be built in Chandler, Ariz., according to a joint announcement by C. P. Gould, president of Southwestern Agrochemical Corp., and Owen Cooper, chairman of the board of First Mississippi Corp.

A new Arizona chemical company will be formed by the two participating corporations to own and operate the new $4 million facility, they said. Chemical Construction Corp. is designing the plant and will begin construction early in 1959.

PENICK, NYQ MOVE TO NEW NYC OFFICES

On January 1, the general offices of S. B. Penick and Co. and its New York Quinine & Chemical Works Div. are being moved to 100 Church St., New York City 8.

MONTROSE MEXICAN PLANT BEGINS PRODUCING DDT

Montrose Mexicana, S.A. has begun operation of a new DDT plant at Salamanca, state of Guanajuato, Mexico. While current Mexican requirements are nine million pounds annually, the plant has a capacity of 15 million pounds of DDT per year. Cost of the plant is reported as 60 million pesos (about $5 million). Montrose Mexicana will distribute DDT to insecticide formulators throughout all of Mexico.

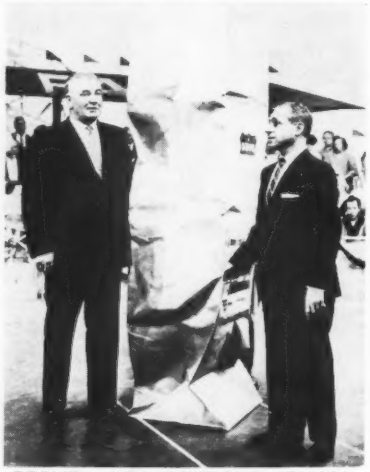
A majority interest in the company is held by Nacional Financiera, together with a group of Mexican shareholders. Minority interest is held by Montrose International—jointly owned by Montrose Chemical Co., Newark, and Stauffer Chemical Co.

The plant will rely upon Mexican raw materials including benzol, alcohol, sulfuric acid and salt. It will obtain chlorine from its own electrolytic caustic-chlorine plant now under construction which will be in operation in the spring of 1959.

Montrose Chemical Corp. of California, which performed the engineering and design for the DDT plant, also provided experienced personnel to train the Mexican operators and to supervise production.

Engineering for the chlorine-caustic plant was done by Krebs and Cie and Societe Alsthom, both of Paris, France. Equipment was furnished by Societe Intercomi of Paris.

TV CONTESTANTS TRY TO PUNCH OUT OF UNION BAG



FORMER HEAVYWEIGHT CHAMPION of the world James J. Braddock (left) was one of the contestants who tried to punch his way out of the bag. He is with Herbert Landon, production supervisor of the show.

The old taunt, "You can't punch your way out of a paper bag" has been basis for a popular stunt on the "County Fair" NBC network television show. Many prominent sports personalities have tried unsuccessfully to break the paper barrier, Union Bag-Camp Paper Corp. reported in November. Among them were Tony Galento, Frank Gifford, Kyle Rote and James J. Braddock.

The bags, made by Union, are eight foot high, three foot wide versions of the regular multiwall bags the company makes for fertilizer and other products.

NO LOST TIME ACCIDENTS IN 6 YEARS AT AAC PLANT

The Spartanburg, S.C., plant of the American Agricultural Chemical Co. completed its sixth year without a lost time accident on December 2, according to George H. Mueller, AAC director of safety.

CENTRAL FARMERS BUYS INTEREST IN NATIONAL POTASH CO.

Central Farmers Fertilizer Co. and National Potash Co. have signed an agreement which calls for the acquisition by Central Farmers of a stock interest in National and the production by National of potash materials for distribution by Central Farmers. This announcement was made December 5 by Richard C. Wells, president of National, and Jos. J. Lanter, president of Central Farmers.

The initial purchase of stock by Central Farmers near the end of the current fertilizer season will be small in amount, National Potash reported. Additional purchases in future years are contemplated, but not to an extent which would give Central control.

Potash delivery to Central Farmers will not begin until July 1, 1959. Both National and members of Central Farmers expect to complete their existing contracts for sale and purchase of potash materials.

Central Farmers is an interregional agricultural cooperative which supplies basic fertilizer materials to members in the Midwest and Pacific Northwest. Its members are regional agricultural cooperatives which manufacture and distribute mixed fertilizers and materials to farmers through a system of local cooperatives. Central farmers also supplies nitrogen products through part ownership of two nitrogen plants and will produce phosphate rock and triple superphosphate at its mine and plant at Georgetown, Ida., scheduled to start production in April, 1959.

Purchase by Central's members of potash produced by National will be at the going market price at the time of sale. Central will be paid a small commission for handling distribution of the material, according to National Potash.

National, which began operations in 1957, has mining and processing facilities near Carlsbad, N.M., and undeveloped additional reserves in New Mexico and Canada.

IMC CONSOLIDATES FOR EFFICIENCY, SERVICE AND MARKETING STRENGTH

International Minerals & Chemical Corp. announced recently a consolidation program which will streamline its organization and "effect greater efficiency of operation, improved customer service and a stronger marketing position."

The move, announced by President T. M. Ware, brings the phosphate chemicals and phosphate minerals divisions into a single phosphate division and consolidates research and engineering into one staff unit handling research, engineering and development.

Le Baron

George W. Moyers, with IMC since 1927 and a vice president since 1952, heads up the new phosphate division. Dr. I. Milton LeBaron, research vice president and an IMC employee since 1942, will direct the newly created staff unit.

Ware said the reorganization, under consideration since early 1958, centralizes responsibilities and planning in the operating and staff areas where such concentration is advisable.

He explained that combining the phosphate divisions "will facilitate expansion to meet the increasing demand for phosphate materials." The two divisions operate in the same markets in some cases, he said, and phosphate rock produced by the minerals division is used to make phosphate concentrates produced by the phosphate chemicals division. Sales of these concentrates were up 20 per cent in 1958 with continuing rises "clearly indicated," Ware said.

Moyers said the phosphate consolidation would not affect the company's sales organization in the various markets. J. K. Westberg remains as sales manager of special products, and S. T. Keel as sales manager of phosphate minerals.

Combining the research and engineering divisions was described by the IMC president as a "natural evolution growing out of the increasingly rapid pace at which today's research findings must be translated into engineering and development action."

The new research, engineering and development division will incorporate five groups under Dr. LeBaron: research, patent management, mining and exploration, engineering, and development.

MONTROSE GETS CONTRACT FOR 11 MILLION LBS. DDT

A contract has been awarded to Montrose Chemical Co. of California by the General Services Administration for 11,325,000 pounds of DDT to be used in the International Cooperation Administration's world-wide anti-malaria program. According to a recent report, dollar value of the award is to be $2,885,535.

EASTMAN CHEMICAL OPENS TWO NEW SALES OFFICES

The Chemicals Div. of Eastman Chemical Products, Inc. has established two new sales offices for its industrial and specialty chemicals in Atlanta, Ga., and Greensboro, N. C.

Located at 3133 Maple Drive, N.E., the Atlanta office will be headed by Jack T. Mahaffey, who will represent Eastman in Georgia, Florida, Alabama, Mississippi and Tennessee.

Richard Fayssoux will be assigned to the Greensboro office, located in the Jefferson Standard Building. His territory will be Virginia, North Carolina and South Carolina.

IMC $500 GRANT TO PENNSYLVANIA STATE

Pennsylvania State University has received a $500 grant from International Minerals & Chemical Corp's Plant Food Div. for research during the fiscal year in plant nutrition and soil fertility. The grant is in support of a program of the Pennsylvania Turf Grass Council investigating fertilizer values on turf grass. The work is directed by Dr. H. B. Musser of the University's agronomy department.

GEIGY FORMS SALES DEVELOPMENT DEPT.

A Sales Development Dept., under the direction of J. J. Hood, has been formed by Geigy Agricultural Chemicals, Division of Geigy Chemical Corp.

Technical service on Geigy agricultural chemicals, development of markets for new pesticides and new uses for those chemicals now available are responsibilities of the department.

Leo Miles and David Whitlow have been assigned to the department.

STAUFFER PRODUCES WEED CONTROL MOVIE

A 12-minute, 16 mm color and sound movie describing modern weed control practices has been produced by Stauffer Chemical Co.

The film depicts efficient methods of applying granular and liquid herbicides, and illustrates the weed control efficacy of Stauffer's preemergence herbicide, Eptam, the company reports. A series of field tests shows increased crop yields which result from herbicide treatments.

Prints of the film may be obtained on loan without charge by contacting Stauffer offices. New York address is 380 Madison Ave., New York City 17.

BENNETT-ROSENDAHL CO. OPENS IN NEW YORK

Harry Bennett and Edward Rosendahl, for the last 30 years president and executive vice president, respectively, of Glyco Products Co., have sold their interests in that company and opened offices in the Coliseum Towers, 10 Columbus Circle, New York City.

As Bennett-Rosendahl Co., Inc., they will act as business advisors to small and medium-sized chemical companies.

PANOGEN EXPANDS

Panogen of Canada, Ltd., Winnipeg, Manitoba, has been formed, as a wholly-owned subsidiary of Morton Chemical Co., to distribute Panogen products in Canada.

William J. Crist has been named manager, Canadian sales. Field representatives are Lionel Hart of Winnipeg and James Taylor of Lethbridge, Alberta.

Associations Meetings

WACA MAKES PLANS FOR SPRING MEETING

Site for the March 17 spring meeting of the Western Agricultural Chemicals Association will be Hotel Miramar, Santa Barbara, Calif.

Discussions of basic pesticide producers' newest products will be held during the morning session. Afternoon speakers will include Dr. R. L. Metcalf, chairman of the department of entomology, Citrus Experiment Station, and Dr. George B. Alcorn, director of extension services, University of California at Berkeley.

MISS. INSECT CONTROL CONFERENCE IN JANUARY

"Problems in Production and Marketing Agricultural Chemicals in Mississippi" is the subject of a panel discussion to be held during the Fifth Annual Mississippi Insect Control Conference, State College, Miss., Jan. 8–9.

Among the speakers and their topics on the program are Jack V. Vernon, president of the National Agricultural Chemicals Association —"National Viewpoint on Problems in Developing New Chemicals;" Dr. A. W. Lindquist, USDA —"Trends in Livestock Insect Control—Present and Future;" Charles A. Parker, executive director, National Aviation Trades Association —"Utilizing the Airplane in the Agricultural and Farming Industry;" and a panel will discuss "Research on Cotton Insect Control."

S. G. BAKER ELECTED SOCMA PRESIDENT

Samuel G. Baker, general manager of the DuPont Organic Chemicals Dept., was elected president of the Synthetic Organic Chemicals Manufacturers Association at its 37th annual meeting at the Roosevelt Hotel, New York City, in December.

Carl A. Gerstacker, Dow Chemical Co., was named first vice president; Chester M. Brown, National Aniline Div., Allied Chemical Corp. —second vice president and James A. Singmaster, Jr., Monsanto Chemical Co.—treasurer. New members of the board of governors are C. Kenneth Egeler, Sherwin-Williams Co., and Thomas C. Keeling, Jr., Chemical & Dyestuffs Div., Koppers Co.

IOWA DEALERS SHORT COURSE SALESMEN'S CONF. IN JAN.

A Fertilizer Salesmen's Conference and Fertilizer Dealers' Short Course will be held Jan. 7 and 8 respectively at Iowa State College, Ames.

Themes for the salesmen's conference are "Soil Fundamentals" and "Yield Potentials." Unravelling the "mysteries" of fertilizing with nitrogen, phosphorus and potassium, and influence of various factors on the fertilizer use outlook for 1959 are among the topics to be covered during the dealers' short course.

DR. F. M. STRONG BECOMES ACS DIVISION CHAIRMAN

Dr. Frank M. Strong, professor of biochemistry at the University of Wisconsin, has been elected chairman of the American Chemical Society's Division of Agricultural and Food Chemistry for 1959. He succeeds Dr. H. L. Haller of USDA.

Dr. Lloyd W. Hazleton of Hazleton Laboratories was named chairman-elect of the ACS division, and Dr. John H. Nair III of Mellon Institute, was re-elected secretary-treasurer.

NPFI SUPPORTS PASTURE DEMONSTRATION IN N. C.

The National Plant Food Institute, through its Southeastern regional office, has arranged with the North Carolina Agricultural Extension Service to support a pasture demonstration program in 10 counties throughout the state. Its aim is to show sound pasture seeding, maintenance and management practices. NPFI is providing a $2,500 grant to support the program for the fiscal year ending June 30, 1959.

Establishment, fertilization, maintenance and management of all forages including permanent and temporary pastures, hay and silage crops is planned.

NATRFD SERVICE AWARD TO LOUIS H. WILSON

Louis H. Wilson, secretary and director of information of the National Plant Food Institute, Washington, D. C., has been presented the National Association of Television and Radio Farm Directors "Meritorious Service Award." Robert C. Miller, president of the association, made the presentation at the NATRFD annual convention in Chicago, Nov. 30.

In 1951, the National Plant Food Institute set up a nationwide recorded *Farm Radio News Service*, consisting of four three-minute talks by leading agriculturalists. Importance of sound land management is featured in the talks—with emphasis on the need for maintaining, replenishing and increasing soil fertility.

Wilson receives award from Miller

Recordings are mailed quarterly, on request, to program directors and radio farm directors. Invitations are sent to non-user radio stations when each series is issued.

The first of the recorded series attracted 304 stations. More than 1,200 stations use the current series. According to Louis Wilson (see photo) this is the largest agricultural "network" using recordings continuously in the United States. Many radio people have told NPFI that listeners find the messages interesting and helpful.

On the program are USDA administrators, and presidents of the American Society of Agronomy, the National Association of County Agricultural Agents, the National Vocational Agricultural Teachers' Association, Inc., and the American Association of Land-Grant Colleges and State Universities.

For television, films ranging in

time from 5 to 13½ minutes are produced and distributed by NPFI. Most of these have been made in cooperation with USDA, land-grant colleges, or ASA. They emphasize the importance to crops and soils of science and sound farming practices.

Requests from radio and TV stations for recordings and films may be sent to: Director of Information, National Plant Food Institute, 1700 K Street, N.W., Washington 6, D. C.

AMCHEM'S BEATTY TALKS AT BRITISH CONFERENCE

R. H. Beatty, agricultural chemicals research director for Amchem Products, Inc. (formerly American Chemical Paint Co.), presented a paper on "Herbicides and the American Farmer" before the fifth British Weed Control Conference, at Brighton, England, in November. Beatty, past president of the Weed Society of America and Northeastern Weed Control Conference, discussed some developments in weed control and the use of herbicides with vegetable crops.

Pointing out that American farmers spray more acres for weed control than for the control of insects and diseases combined, Beatty reported that most of the herbicides used on vegetables are applied before emergence of weeds or crops.

SANDERS, RUPP RECEIVE SOIL BUILDERS AWARDS

Winners of this year's Soil Builders for Editors Awards, presented annually by the National Plant Food Institute, are Editor Paul D. Sanders and staff of *The Southern Planter* in Richmond, Va., and Robert G. Rupp, associate editor of *The Farmer* magazine, St. Paul.

Rupp was winning writer among magazines with less than 300,000 circulation and *The Southern Planter* staff in the over 300,000 circulation category.

Presentation of plaques was made by Louis H. Wilson, secretary and director of information for NPFI, during the December 3 annual meeting of the American Agricultural Editors Association in Chicago.

CALIF. FERTILIZER ASSN. ELECTS NEW OFFICERS

During the California Fertilizer Association's 35th annual convention at the Ambassador Hotel, Los Angeles, Nov. 9–11, the CFA board of directors elected Howard H. Hawkins, Golden State Plant Food Co., 1959 president. Named vice president was M. M. Stockman, Mountain Copper Co., Ltd.; secretary, James F. Sloan, J. F. Sloan Co. and treasurer, Fred R. Bryant, Brown and Bryant.

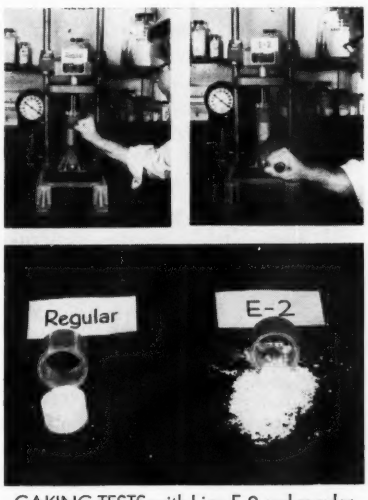
Board members elected at the meeting are Hawkins; Stockman; Sloan; L. R. Hamilton of California Spray-Chemical Corp.; and C. E. McFaddin, Imperial NH_3 Service Co.

Chemicals

MONSANTO MARKETS LION E-2 AMMON. NITRATE

James E. Crawford, Jr., director of marketing for Monsanto Chemical Co.'s Inorganic Chemicals Div., has described Lion E-2 ammonium nitrate fertilizer as a dust free, hard prill, high density product that retains its prill uniformity and does not cake during storage, even under the most adverse conditions.

Despite fluctuations of pressure, temperature or humidity, E-2 remains free-flowing, according to Crawford.



CAKING TESTS with Lion E-2 and regular ammonium nitrate. At top, fertilizers are subjected to 600 pounds of pressure per square inch in laboratory pressure cylinders. Lower photo compares regular ammonium nitrate prills (left) and E-2 prills (right) coming out of the cylinder. Monsanto points out that to exert pressures of 600 psi on a 100-pound bag of fertilizer it would be necessary to stack 3,672 other 100-pound bags on top of it.

Monsanto is now manufacturing E-2 at its Luling, La., and El Dorado, Ark., nitrogen plants. It is available in polyethylene and polyethylene-lined multiwall paper bags.

For further information,
CIRCLE 30 ON SERVICE CARD

CYANAMID DEVELOPS CYPREX FOR APPLE SCAB CONTROL

A new fungicide which promises to take some of the critical timing worry out of apple scab control has been developed by American Cyanamid Co. It will be introduced to the trade under the brand name Cyprex (dodecylguanidine acetate) and will be available to growers in the major fruit areas early in 1959.

In announcing the new product, Dr. J. F. Yost, director of plant industry development for the Agricultural Div., praised the fungicide's eradication and protection properties.

Cyprex underwent three years of federal and state field testing. Present FDA clearance is for the control of apple scab through first cover sprays. Cyanamid completed two years of chronic toxicity studies in December which, together with extensive field studies, will be used to petition for a tolerance permitting later apple cover sprays as well as full season use on cherries and pears.

2,4-D KILLS WEEDS AND GOPHERS TOO

A report from Colorado State University says that when 2,4-D was used recently to rid rangeland of weeds, not only were the weeds removed, but also 87 per cent of the pocket gopher population.

Apparently removal of the weeds cut off the gophers' principal food supply, and rather than move to another place, they simply starved to death.

Now Colorado scientists are conducting research to determine how other rodents such as field mice, chipmunks and ground squirrels will respond when 2,4-D application makes similar changes in their food supply.

This research is being conducted

under terms of a grant by the National Science Foundation to the Colorado State University Research Foundation.

TWO NEW SAFETY DATA SHEETS ISSUED BY MCA

Two new safety data sheets, *Phosphoric Acid* and *Phosphorus Pentasulfide*, are now available from the Manufacturing Chemists' Association.

SD-70, Phosphoric Acid describes the control of hazards, handling and storage, aspects of employee safety and other factors in using the material.

SD-71, "Phosphorus Pentasulfide, a 14-page booklet, shows how hazards can be avoided, describes protective equipment for high gas concentrations, recommends safe handling containers and waste disposal methods. First aid measures and suggestions for physicians also are included.

The booklets are available at 30 cents each from the Manufacturing Chemists' Association, Inc., 1625 Eye St., N.W., Washington 6, D. C.

USDA CLEARS SEVIN FOR USE ON COTTON

Crag Sevin insecticide, 50 per cent dust base, has been accepted by USDA for use in formulating dusts to control all major cotton insects.

Dr. R. H. Wellman, manager, Crag Agricultural Chemicals, Union Carbide Corp., said acceptance of the label clears the way for first domestic marketing of Sevin to growers for regular applications next year on cotton. During the past season, Sevin was made available in major cotton areas for field-testing only.

Union Carbide will sell the dust base to formulators.

The new Sevin label gives required dosage of one-half to one pound of active insecticide per acre for early-season control of thrips and fleahopper. For mid-season and late-season control of boll weevil, bollworm, pink bollworm, aphid, leafworm, lygus bugs and leaf perforators, the required Sevin dosage is one to two pounds of active ingredient per acre applied every five to seven days.

Dr. Wellman said the insecticide, a carbamate, is believed to be compatible with all pesticides commonly used on cotton, including sulfur and miticides.

Recent tests conducted by the Boyce Thompson Institute for Plant Research indicate that Sevin is 200 times less toxic to goldfish than DDT.

People

American Agricultural Chemical Co. R. M. Richey has been named general superintendent of fertilizer production. Formerly western division superintendent, he has moved to New York to direct all fertilizer production operations for the company. R. E. Lehmkuhl, who replaces Richey as western division superintendent, will continue to headquarter in Danville, Ill.

California Spray-Chemical Corp. Appointment of Claude T. Davis as assistant to E. L. Stripling, Jr., regional manager—southern, was announced recently. For the time being, Davis will headquarter at Calspray's eastern office in Washington, D. C.

James P. Toffaleti has been named directeur technique for Calspray's French subsidiary, California Spray-Chemical Compagnie Francaise. A Calspray employee for the past 12 years, Toffaleti was most recently district manager for the South Central U.S.

Commercial Solvents Corp. Neal Van Kirk becomes general traffic manager. Formerly associated with Darling & Co., Van Kirk has been a licensed practitioner before the Interstate Commerce Commission since 1954. He is a graduate of the College of Advanced Traffic in Chicago.

Van Kirk

Dow Chemical Co. Donald K. Ballman, director of sales, and C. B. Branch, manager of the Plastics Dept., have been elected to the board of directors, replacing Dr. E. O. Barstow and R. L. Curtis, who have retired. Barstow becomes honorary chairman of the board, and Curtis, who retired also as general manager of Dow's Western Div., retains a vice presidency and remains senior officer on the West Coast.

Leland A. Doan, assistant general manager of the division since 1955, replaces Curtis as Western Div. general manager.

Two new sales office supervisor appointments have been announced by Dow. Hubert D. Crain is the first supervisor of agricultural chemical sales in the Minneapolis office. He is being replaced in his similar post in the St. Louis office by Howard W. Sheldon.

Crain

Sheldon

Crain, who has been with Dow since 1926, has supervised agricultural chemical sales in St. Louis since 1946.

Sheldon, with Dow Since 1954, headed the merchandising section for agricultural chemicals in Dow's home office for the past three years.

Other transfers include J. L. Maxwell, to area supervisor for farm-sale products; and George Klepser to Maxwell's former position as product manager for space and grain fumigants. He had been assistant to Maxwell for the past two years.

Manufacturing Chemists' Association. James F. King has been named to head up government relations for the association. MCA president, Gen. John E. Hull, made the announcement.

King, who has held a number of advisory and administrative positions in the U. S. government,

went to MCA after serving as assistant to the director of the Office of Civil and Defense Mobilization. He succeeds Claude E. Hobbs, MCA staff counsel, who has resigned.

McLaughlin Gormley King Co. Carroll A. Clark was elected president at a meeting of the board of directors on Nov. 18, when former president George A. McLaughlin was named chairman of the board. Active management of all phases of company operations will be directed by Clark. Since he went to the company in 1932, he has been a chemical engineer, vice president and general manager, and president of the subsidiary company McLaughlin Farm Chemicals, Inc.

Clark

Clark will continue as president of the subsidiary firm.

Mississippi River Chemical Co. Dorvan C. Rolston joins the company as sales representative, with headquarters in El Paso, Ill., according to John L. Sanders, sales manager. Rolston had been with a southern ammonium nitrate producer for the past three years.

Rolston

Panogen Co. Dr. Raymond P. Seven, former director of agricultural research at Morton Chemical Research Laboratory, has been appointed technical director of Panogen, a division of Morton Chemical Co. He will supervise product development and field use.

Seven

Smith-Douglass Co. Four quarter-century employees recently were presented with engraved gold watches by Board Chairman Ralph B. Douglass (far right). They are A. Y. Murray, representative at Lincolnton, N. C.; F. H. Ewell, manager of the Statesville, N. C. sales office; John C. Mapp, manager of Growers Seed & Fertilizer Co., Exmore, Va.; and Julius F. Timberlake, Louisburg, N. C. representative.

Summers Fertilizer Co. Jere Moynihan has been appointed general manager of Summers' operations in Maine and its Canadian Div. at St. Stephen, New Brunswick. His headquarters will be at Sandy Point, Me.

Previously, Moynihan was assist-

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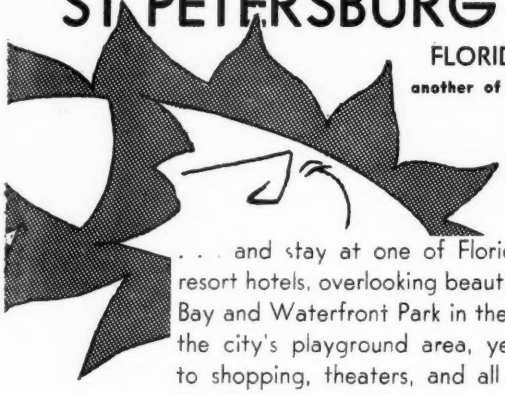

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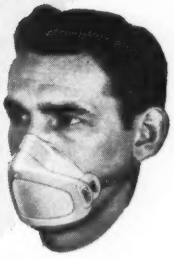

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ant to his predecessor, Fred L. Litty, now vice president and general manager of Northern Chemical Industries at Searsport, Me.

Stauffer Chemical Co. Robert P. Malcolmson becomes technical sales representative, Agricultural Chemicals Div., with headquarters at Holton, Mich. The company reports he will provide technical service to Stauffer dealers and distributors in Michigan and maintain liaison with experiment stations.

Malcolmson

Arthur T. Newell, manager of the Henderson, Nevada, Works of Stauffer, is retiring January 1, but continues as a consultant. James F. Orr succeeds Newell as works manager and Leonard J. Edwards has been named assistant works manager.

Swift & Co., Agricultural Chemical Div. J. E. Benson has been appointed manager at Albany, Ga., succeeding A. N. D'Aubert who died in October. Since joining Swift at Atlanta in 1946, Benson has been a field representative, credit manager at Norfolk, Va. and Albany and assistant manager at Albany.

Texas Gulf Sulphur Co. has elected three new members to its board of directors—Allan Shivers, former Governor of Texas; Leslie M. Cassidy, former chairman and president of Johns-Manville Corp.; and John A. Hill, president of Air Reduction Co., Inc.

Witco Chemical Co., Inc. G. Thomas Catherines has joined the Advertising Dept. of Witco as assistant to the advertising manager, a new position.

Catherines formerly was with the development department of Evans Research. A graduate of Bradford Durfee College of Technology, he currently is majoring in marketing at New York University, Witco reported.

Equipment Supplies

HOUGH ANNOUNCES NEW H-90 PAYLOADER

A new rubber-tired, four-wheel drive model, the H-90 Payloader, now is being marketed by The Frank G. Hough Co. The new unit, which replaces the former HO model, has 9,000 lb. load carry capacity at average travel speeds, Hough reports. Both gas and diesel power units are available.

Hough says that one feature of the new model is "low-profile"

front shroud, which gives the operator improved visibility. The H-90 Payloader has a breakout force of 21,000 lbs. and a bucket tipback of 44° at ground level. For complete information,

CIRCLE 31 ON SERVICE CARD

DISK-TYPE FERTILIZER APPLICATOR DEVELOPED

Agricultural engineers of the Oklahoma Experiment Station report development of a disk-type fertilizer applicator that so far has proved superior to split-boot and other conventional applicators in other Oklahoma station trials.

The disk-type applicator, they say, enables farmers to secure—with no increase in the seeding rate of crops—thicker and more uniform stands, possible increases in yield and plants better suited to mechanical harvesting.

DRYING OVEN FROM NEW BRUNSWICK SCIENTIFIC

A new drying oven for use in paper chromatography has been developed by New Brunswick Scientific Co. Paper chromatography offers a method of separating and analyzing, on filter paper, minute quantities of organic or inorganic compounds. This laboratory technique is finding increased application in control procedures and research in the fertilizer, milling and feed fields, the company says.

The oven heats to a pre-set temperature up to 110°C. within about 20 minutes, the manufacturer reports. It is 33½" high, 27" wide and 14" deep at base, with a 7" inside depth of heating chamber.

For further information,

CIRCLE 32 ON SERVICE CARD

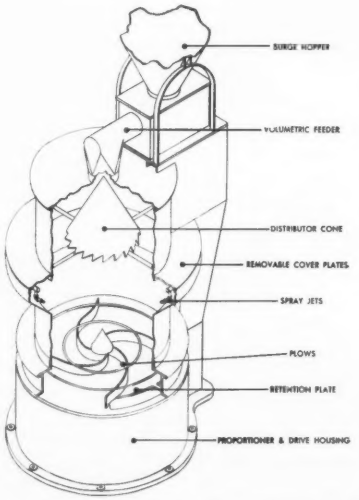
BLENDER FOR DRY OR LIQUID-DRY MIXTURES

According to Johnson-March Corp., its new continuous-flow blender proportions, mixes, blends and discharges a wide range of dry materials, or blends liquids with solids in precise quantities.

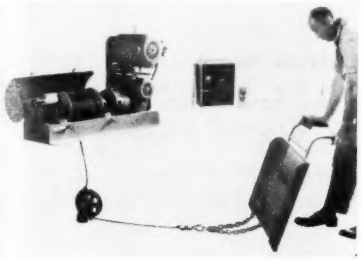
The blender, called Verticone, has many applications in the farm chemicals industry, the manufacturer reports—such as mixing and blending of dry chemicals, and addition of liquid ammonia to potash and phosphates. Verticone treatment also is said to control dust created by unloading or discharging superphosphates, potash and potassium magnesium sulfate from bins or silos. Where only solids are blended, Johnson-March reports that effective and economical dust control can be provided by conditioning with Compound MR solution, a surface active compound developed to keep fine particles evenly dispersed to prevent segregation in the mix and eliminate dust.

More information is available. Just

CIRCLE 33 ON SERVICE CARD



ELECTRO-MATIC SHOVEL INTRODUCED BY MUNSON



A recent addition to Munson Mill Machinery Co.'s line is an Electro-matic Scoop for use in handling and loading bulk material. The system of magnetic controls on the scoop is operated by the worker's thumb.

Among the design features of the unit are grooved cable drum, long life steel cable, and new type door grapple, the manufacturer reports.

For details,
CIRCLE 34 ON SERVICE CARD

Government

CONCRETE AGGREGATE: BYPRODUCT OF FERTILIZER

In efforts to find new uses for the byproducts of phosphate fertilizer production, TVA reports it has developed a process for making lightweight concrete aggregate by expanding electric-furnace slag. Development of markets for byproducts helps industry keep down the cost of fertilizer production, TVA pointed out.

W. C. Scott of TVA said that the need for lightweight aggregate in concrete construction provides a large and growing market. Expanded slag is in great demand and is shipped to a much wider market area than granulated or air-cooled slag, Scott continued.

Six companies and TVA produce elemental phosphorus by the electric furnace process in this country. Total annual capacity of all production facilities is over 350,000 tons of phosphorus, corresponding to the production of over 2,500,000 tons of byproduct slag annually.

NEW TAX GUIDE FOR SMALL BUSINESS

The new 1959 edition of *Tax Guide for Small Business*, published by the Internal Revenue Service, contains 128 pages of explanations and answers to tax problems of the small-business man.

It explains, in layman's language, the tax results from buying a business, starting a business, operating a business and the sale and other disposition of a business. Among the subjects covered are accounting periods and methods, inventories, business expenses, repairs and improvements, depreciation, entertainment expenses, traveling expenses, self-employment taxes and others.

Copies are available, at 35 cents each, from Superintendent of Documents, Department T, Government Printing Office, Washington 25, D. C.

Calendar

Jan. 7-8. Fertilizer Short Course, Iowa State College, Ames.

Jan. 7-9. Northeastern Weed Control Conference, Hotel New Yorker, New York City.

Jan. 8-9. Annual Insect Control Conference, Mississippi State University, State College.

Jan. 12-13. Winter Meeting, Ohio Pesticide Institute, Neil House, Columbus, Ohio.

Jan. 13-14. Georgia Plant Food Educational Society annual meeting, Georgia Center for Continuing Education, University of Georgia, Athens.

Jan 14-15. North Carolina Pesticide School, College Union Building, N. C. State College, Raleigh.

Jan 20-22. California Weed Conference, Miramar Hotel, Santa Barbara, Calif.

Jan. 21-22. Northwest Agricultural Chemicals Industry Conference, Benson Hotel, Portland, Ore.

Jan. 21-23. Western Cooperative Spray Project, Benson and Imperial Hotels, Portland, Ore.

Jan. 22-24. Agricultural Aircraft Association, Senator Hotel, Sacramento, Calif.

Jan. 26-29. Plant Maintenance and Engineering Show, Public Auditorium, Cleveland, Ohio.

Jan. 27-28. Nematology Workshop, sponsored by Shell Chemical Corp., Portland, Ore.

Jan. 28-29. Illinois Custom Spray Operators' Training School, University of Illinois, Urbana.

Jan. 29. South Dakota Fertilizer Dealer Short Course, South Dakota State College, Brookings.

Jan. 29-30. Annual Meeting, Colorado Agricultural Chemicals Association, Cosmopolitan Hotel, Denver.

Feb. 12-13. Midwestern Agronomists-Fertilizer Industry Representatives annual meeting, sponsored by National Plant Food Institute, Edgewater Beach Hotel, Chicago, Ill.

Feb. 13. Executive Committee of Fertilizer Section, National Safety Council, Winter Meeting, Heart of Atlanta Motel, Atlanta, Ga.

Feb. 24-25. Alabama Pest Control Conference, Alabama Polytechnic Institute, Auburn.

March 10-11. Canadian National Packaging Conference, sponsored by Packaging Assn. of Cannda, King Edward Hotel, Toronto.

March 17. Western Agricultural Chemicals Assn. Spring Meeting, Hotel Miramar, Santa Barbara, Calif.

March 17-18. Air and Water Pollution Abatement Conference, sponsored by Manufacturing Chemists' Assn., Netherland Hilton Hotel, Cincinnati, O

April 5-10. American Chemical Society National Meeting, Boston, Mass.

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PATENT REVIEWS

By Dr. M[illegible]win Nord

PLANT GROWTH REGULANT, DEFOLIANT AND HERBICIDE

U.S. 2,849,835, issued Sept. 2, 1958 to Majon Huff, assigned to Colorado Serum Co., describes a method of soilless cultivation, using gibberellic acid.

Seeds are first soaked in a weak solution of gibberellic acid, and then drained and treated with a weak hypochlorite solution. The seeds are then irrigated at daily intervals with a liquid fertilizer solution.

U.S. 2,852,361, issued Sept. 16, 1958 to Thomas E. Lesslie, assigned to Monsanto Chemical Co., discloses a method of defoliating plants with a new class of thionocarbamates, e.g., diethyl-N, N'-ethylenebis (thionocarbamate).

U.S. 2,854,325, issued Sept. 30, 1958 to Norman E. Searle, assigned to E. I. du Pont de Nemours & Co., discloses the use as herbicides of 2, 3, 6-trichlorothiolbenzoic acid and related compounds.

FERTILIZER PROCESSES DESCRIBED IN 3 PATENTS

U.S. 2,850,358, issued Sept. 2, 1958 to David H. Reeve, assigned to U.S. Atomic Energy Commission, relates to the recovery of P_2O_5 values normally lost in precipitates consisting predominantly of iron phosphate and aluminum phosphate when processing leached zone material of the overburden found in the Florida phosphate fields.

The iron phosphate and aluminum phosphate precipitates are digested with concentrated sulfuric acid. Water is eliminated, and iron and aluminum sulfates are crystallized. The crystalline material is heat treated to decompose the sulfates, thus recovering iron and aluminum in the oxide form. The solids-free solution of sulfuric and phosphoric acid is recycled to the digestion of more leached zone material.

U.S. 2,851,335, issued Sept. 9, 1958 to Eric Heinerth, assigned to Henkel & Cie., describes a process for producing readily filterable calcium sulfate during the manufacture of phosphoric acid by the wet process.

The filterability is improved by adding to the calcium phosphate before reacting it with sulfuric acid, salts of bivalent metals which are soluble under certain conditions (e.g., salts of magnesium).

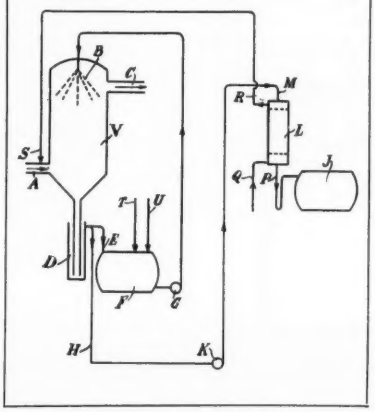
U.S. 2,852,340, issued Sept. 16, 1958 to Otto Kipke, assigned in part to Trans-Oceanic, relates to methods for making ammonium nitrate fertilizers with the simultaneous recovery of magnesium hydroxide, magnesium carbonate or magnesium oxide through the treatment of crude dolomite with nitric acid and magnesium sulfate.

AMMONIUM SULFATE MANUFACTURE

U.S. 2,852,342, issued Sept. 16, 1958 to Kenneth Mac Gregor, assigned to Simon-Carves Ltd., relates to the treatment of coke oven gas with sulfuric acid solution to produce a solution of ammonium sulfate containing free sulfuric acid which is subsequently treated in an evaporator to recover the ammonium sulfate.

As shown in Fig. 1., the coke oven gas is introduced into a main scrubber V at A and leaves at C. In the scrubber V, it is treated with a solution of ammonium sulfate containing free sulfuric acid which is introduced as a spray at B. The liquor falls into a seal pot D, and overflows, entering a tank F at E. From this tank, liquor is pumped by a pump G back to the spray B. Sulfuric acid is added at T so as to maintain the concentration of free acid in the liquor, and water is added at U to prevent the concentration of ammonium sulfate from rising to such an extent that crystals of ammonium sulfate would be deposited in the scrubber.

FIGURE 1.



A stream of liquor is bled off from the circuit through a pipe H, and is pumped by a pump K to a small packed scrubber L, entering it at M and leaving at P. Vapors from an ammonia still are introduced into the bottom of this scrubber L at Q and removed at R. In the scrubber L, ammonia from the vapors reacts with free sulfuric acid liquor so that the acidity of the liquor leaving at P is reduced. This liquor then flows to a storage tank J and then to an evaporator system of conventional design, where ammonium sulfate crystals are produced. The vapors leaving the scrubber R may still contain ammonia and are consequently introduced into the coke oven gas stream at S prior to treatment of the gas in the main scrubber V.

SOIL CONDITIONING AND STABILIZING

U.S. 2,851,824, issued Sept. 16, 1958 to Joseph A. Campbell, assigned to X-Port Oils, Inc., discloses a method of treating soils to increase their water retention, forming small, loose aggregates of soil particles and stabilizing the soil so that it will not puddle in the presence of saturating water nor blow away under the influence of high winds.

A fine spray is applied to the soil, consisting of an aqueous dispersion containing 1–10 per cent by weight of asphalt having hydrophilic characteristics. The spray is applied in a quantity insufficient to form a continuous film on the surface of the soil. Small aggregates of soil are then formed by tilling the soil to distribute the asphalt throughout the upper portion of the soil.

MAKING CRYSTALLIZED ANHYDROUS PHOS. ACID

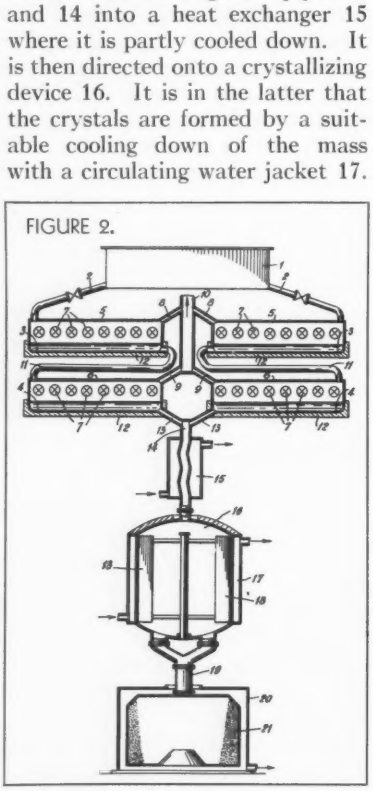
U.S. 2,847,285, issued Aug. 12, 1958 to Rene Pahud, assigned to La Fonte Electrique S.A., describes a method and apparatus for manufacturing crystallized, pure, anhydrous phosphoric acid, assaying at least 98 per cent H_3PO_4.

As shown in Fig. 2., a tank 1 contains the phosphoric acid starting solution. One may add to this solution an oxidizing agent, preferably a volatile one. The solution is then ready for concentration and is allowed to flow, through pipes 2, into evaporating apparatuses, two of these being represented on the drawing and operating in parallel.

These apparatuses are each constituted by two vats 3 and 4, each surmounted by vacuum-chambers 5 and 6, respectively, in which are arranged emitters 7 of infra-red radiations. The two chambers 5 and 6 are connected to an intake fan by the tubes 8 and 9 and by the pipe 10. The vats 3 and 4 follow each other, the starting solution arriving in the vat 3, then flowing into the vat 4 by the pipe 11. The vats are thermally insulated on their outside by a lining 12. The solution which flows into them is heated by the radiation of the emitters 7 while being under reduced pressure. The water thus evaporated is withdrawn by the pipe 10. The acid is thus concentrated without formation of pyrophosphoric and metaphosphoric acids. This formation is moreover prevented by the presence of the oxidizing agent, which also oxidizes the oxidizable impurities which may be contained in the starting solution.

The solution is treated in the evaporation apparatuses until assaying at least 68 per cent of P_2O_5. It then flows through the pipes 13 and 14 into a heat exchanger 15 where it is partly cooled down. It is then directed onto a crystallizing device 16. It is in the latter that the crystals are formed by a suitable cooling down of the mass with a circulating water jacket 17.

FIGURE 2.



This device is fitted with a stirrer 18 having a specially designed form in order not to break up the crystals and of which the speed does not exceed 2 cm./sec. The crystals reach at least 1 mm. in their largest dimension.

The crystal magma thus obtained is removed from the crystallizing device by air pressure and is introduced by means of the pipes 19 into a hydroextractor 20. The mother liquors are thus eliminated from the product 21 which is then put into bags under crystalline form.

PESTICIDAL PROPERTIES AND USE DESCRIBED

U.S. 2,850,425, issued Sept. 2, 1958 to Van R. Gaertner, assigned to Monsanto Chemical Co., discloses the use as a fungicide for treating plants, of aromatic hydrazines such as 1-benzyl-1-phenylhydrazine.

U.S. 2,852,426, issued Sept. 16, 1958 to Roy E. Stansbury, assigned to Phillips Petroleum Co., discloses the use of certain carboxylic acids and their esters of saturated alcohols as nematocides (e.g., dimethyl sebacate).

U.S. 2,852,427, issued Sept. 16, 1958 to Jamal S. Eden, assigned to Diamond Alkali Co., discloses the use of 2-piperonyloxazolidine as a toxicant for use in controlling various micro-organisms (fungi, bacteria, insects and plants).

U.S. 2,853,415, issued Sept. 23, 1958 to Christopher E. D. Smith and William A. Wynne, assigned to Imperial Chemical Industries Ltd., discloses the fungicidal properties of 1:2-dibromo-1:1:2:2-tetrachloroethane.

U.S. 2,853,519, issued Sept. 23, 1958 to Richard S. Cook and W. E. Craig, assigned to Rohm & Haas Co., discloses the use of amine salts of N-4-nitrophenyl-3, 4-dichlorobenzenesulfonamide as pesticides.

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EDITORIAL

Our new marketing approach —and what it can do for you

What makes a publication of long standing "suddenly" change its entire editorial approach? Many of our loyal readers will be asking themselves that question when they pick up this issue of FARM CHEMICALS and scan the handsome new format with the very evident marketing "twist."

To staff members of FARM CHEMICALS, however, this change did not just occur "overnight" —although no advance billing was given to the coming change in these columns. Even as we performed the tasks of compiling the remaining issues for 1958 (which were most warmly received —see "Letters", page 6), the vision of the *new* FARM CHEMICALS was *fresh* and *challenging!* The journalist's irresistible desire to create . . . to fill a long felt need . . . is satisfied with the *first issue* of volume 122!

Despite this change, FARM CHEMICALS still plans more editorial coverage on technical service.

Now about marketing . . . Our purpose is to provide the kind of marketing help that will help make it possible for you to sell more merchandise . . . *profitably!*

We think that's the key to the farm chemical industry's main dilemma of over-supply and unstable prices.

For many months, this January issue with the *five* distinctly new sections has been our No. 1 project. The seemingly endless planning and brainstorming sessions . . . the sounding out of you pesticide formulators, fertilizer mixers, sales managers, plant foremen and top industry leaders in your plants, convention halls and conference rooms . . . are now history. *The big task lies ahead.*

We have mentioned the *main* factor affecting this major change in our editorial policy—but there is another important reason behind our move:

Because of the heterogeneous nature of our *total* readership, there is a need for *convenient organization of editorial material.* Most media in the farm chemicals field profess to serve essentially the same groups (which are referred to later) as does FARM CHEMICALS—*about 18 categories* under 1) management, 2) production and 3) marketing.

Does it not make good sense, then, to organize the material for *easy access* by each group of readers?

FARM CHEMICALS stands alone as the publication which *efficiently* provides specific, yet intensive, coverage for busy people in top management, production, sales, research—right through to on-the-farm application.

As we stated, the great vacuum has occurred in *market planning* and *merchandising*, for which FARM CHEMICALS pledges unimpeachable sources of valuable information monthly. Take, for instance, this month's article by Ted Nowak, principal for the well known, highly respected marketing and management counsel, Alderson Associates, Inc., Philadelphia. This firm is in daily contact with some of the largest and most successful farm chemicals companies.

Just as Fred C. Foy, president of Koppers Company, Inc., recently told the annual convention of The Chemical Specialties Manufacturers Association in New York City (*see "Creative Pricing," page 15*) "the roll call of those in favor of sound pricing includes just about everyone who is in favor of motherhood," we're also aware that *actions speak louder than words.* However, we have faith in the industry's ability to *upgrade its merchandising practices.*

What's more important: if you'll read this month's *Marketing* and *Merchandising Aids and Promotion* sections, you'll readily see that we've already begun to help you to *do something constructive* about the situation! We refer, of course, to the preceding two articles—*plus* another, "IMC's Full Orbit Program" (complete with merchandising calendar) on page 20.

Next month's marketing "line-up" is equally as impressive.

Because marketing experts have said it far better than we can, we'll not go into a lengthy dissertation on how to set up an efficient marketing structure that can help you increase sales in 1959.

If your area of work is *outside* of marketing, we hope you'll come to *personally identify yourself* with one of the following remaining sections:

▶ *Production Methods*—for plant foremen, managers, superintendents, control officials and other technical people.

▶ *Materials Handling & Custom Application*—for equipment engineers and sales people, custom fertilizer spreaders, custom sprayers and dusters, anhydrous ammonia and fertilizer solutions dealers and distributors, and aerial applicators.

▶ *Technical Review*—for consulting entomologists, testing laboratory technicians, research personnel for the USDA, college experiment stations—and, of course, basic manufacturers of all farm chemicals and related products.

We will provide you with the principles and *examples* of good marketing procedure, expanded services, etc., but the proper *application* of these principles to *sell* potential customers will be up to YOU.

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